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REPORT OF THE

Secretary of Agriculture

1948

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REPORT OF THE

Secretary of Agriculture

1948

UNITED STATES DEPARTMENT OF AGRICULTURE

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REPORT OF THE
Secretary of Agriculture
1948

WASHINGTON, NOVEMBER 30, 1948

To the President

THE YEAR IN AGRICULTURE

Another year of high production on United States farms is drawing to a close, the ninth in succession. Production of crops is a record by a wide margin; production of livestock and livestock products, though smaller than in any year since 1941, is larger than that of any year before then. Livestock operations reflected small production of feed grains in 1947, but showed signs of early renewed expansion. Some important changes in agricultural production took place. Farmers responded to goals for larger acreages than in 1947 of corn, oats, barley, sorghums, dry beans, and flaxseed. Acreages suggested for wheat, rice, and soybeans were the largest deemed compatible with reasonably safe farming. Production of peanuts and of tobacco seemed to be catching up with demand; goals for these crops called for some reduction. Goals for other annual crops were about the same as the acreages planted in 1947. Farmers planted almost 363 million acres of the principal crops, or more than the 1947 total by 4 million acres. This was the largest planted acreage since 1937, with the exception of the war year 1944.

Livestock production, one of the year's most difficult problems, included special efforts to use feed efficiently. The Department of Agriculture distributed information about feeding practices to livestock producers throughout the country. Also, it recommended substantial culling of poultry to reduce poultry numbers. The program succeeded, but the demand for livestock products rose and resulted in new price advances, with indications of continued inflationary pressure. Action to reverse the decline in hogs and poultry numbers began as soon as this year's abundant feed production became available. The results should be apparent before the end of 1949 in hog production and poultry. Within a year or two afterwards, cattle numbers may stabilize or turn upward. Probably late 1949 will mark an upturn in meat output, even if it does not bring a great increase in production.

Domestic Consumption of Farm Products

Consumption as well as production of agricultural commodities in the United States was at a near-record level in 1948. Consumption of food, though slightly lower than in 1947 on a per capita basis, was 12 percent per capita above prewar average and was distributed by economic groups with less unevenness than in prewar years. Civilians consumed a larger proportion of the available food supply than in any year since 1941. Shipments out of the country, for United States military uses, United States Territories, and exports, took only 8 percent. Greater than those of 1947 in cotton and dried fruits, the overseas shipments were about the same in wheat and in fats and oils, and smaller in dairy products, fresh fruit, tobacco, eggs, and meats. Huge by comparison with the exports of the interwar years, the shipments sent abroad this year came out of the wartime and postwar gain in this country's farm production and consequently involved no hardship to domestic consumers but on the contrary went along with a sustained expansion in the domestic consumption.

True, the per capita domestic food consumption in 1948 was down somewhat from the showing of recent years in both quantity and quality. Nevertheless, full employment at high wage rates enabled most families to have good diets. As mentioned, the supply per capita was much above the prewar supply in quantity despite the overseas demand; and from a quality standpoint the improvement as compared with prewar years was even greater. This was evident in striking increases in the per capita consumption of milk, eggs, meat, citrus fruit, and green and yellow vegetables. Consumption of milk was near the wartime peak. Quality in food continued to advance from the influence of State laws for the "enrichment" of flour and flour products with vitamins, though Federal decrees for that purpose had lapsed. Educational programs by Federal and State agencies and private organizations favored progress in food quality and consequently in the Nation's nutrition.

Unevenness in Food Distribution

Yet good nutrition was not universal though it was general. Our food supply, even after the exportation of tremendous quantities, was sufficient to give every person in the country the dietary allowances recommended by the National Research Council. Not every person received these allowances. Large numbers did not, owing partly to faulty eating habits and partly to lack of purchasing power. Many families in the lower income groups satisfied food requirements at the expense of other needs, or did without sufficient good food. With per capita incomes more than twice the prewar average, figures gathered in 1946 showed that about 17 percent of the nonfarm families of four persons then had incomes of less than $2,000. The four-person family with less than $2,000 to spend in a year could not feed all its members well. Even a low-cost standard food plan for such a family, with prices double the prewar level, involved a cost of $800 to $950. Necessarily, many families skimped either on food or on other essential things.

World food conditions improved. Food supplies available for consumption in the marketing year 1947–48, though up considerably from the previous year, were still far below prewar averages both in Europe and in the Orient. Many countries could not maintain good diets. Growth in world population complicated food problems. With crop production below prewar production in extensive food-deficit areas, and with their populations often as much as 8 percent larger, subsistence was a tragic problem for multitudes. Many countries relied heavily on food imports financed partly by United States loans and gifts. World wheat import requirements declined in urgency to some extent, following substantial gains in Europe's grain production, but purchasing power was the limiting factor rather than human need. The European wheat crop was 400 million bushels above that of 1947, yet the production was 200 million bushels below the prewar average, with the consuming population larger. Again the United States made a greater contribution to world food needs than any other country. Our overseas shipments of wheat in 1947–48 amounted to 481 million bushels—more than half the world total. It was evident the United States would not long continue to export such quantities. Cereal production was increasing in other exporting countries, as well as in deficit areas. Moreover, importing countries were eager to balance their diets through greater emphasis on proteins and fats. Shortage of dollar exchange was a continuing difficulty, only partly lessened by the Economic Recovery Program.

Continued High Farm Earnings

Earnings of United States farmers were high throughout 1948. Marketings were somewhat less than in 1947 as a result of lessened production of livestock, but prices averaged higher. Costs of farm production were higher also. Farm wage rates were more than three times the prewar level. Allowance for increased costs suggested that after the farmers had paid their production expenses plus interest and taxes they would have about 17 billion dollars of net income, as compared with 18 billion dollars in 1947. The distribution of this income, by commodities and regions, differed considerably from that of 1947. For example, receipts of wheat marketings were substantially less than in the previous year and receipts from poultry and eggs were lower. Receipts from livestock products taken together, however, were about the same. Cotton promised to return a larger gross income to producers than in the previous year. Cotton prices declined from peak levels, but the cotton crop was large.

Yet even with farm-produced food and other things counted in, farm families continued to average lower incomes per capita than city families notwithstanding considerable recent improvement, and often had difficulty in making their expenses. Also, thousands of farm families were on unproductive farms with small chance of climbing out of the low-income brackets. Such families produced little for the market and could not profit from the prevailing high prices; yet they had heavy cash expenses, especially for purchased foods. Mounting land rentals and land values were disadvantageous to farmers generally. Land rentals, at a record high, were thrice the prewar average; while land values for the country as a whole averaged as high as those that preceded collapse after World War I. Furthermore, in contrast with that of previous recent years, the land-value situation involved an increase in the country's total farm-mortgage debt. Buyers able to pay cash were less numerous.

Legislation for Price Supports

Wartime legislation for agricultural price supports was in effect throughout the fiscal year 1948; it applied to basic crops harvested and to Steagall commodities marketed through December 31, 1948. Under this price-support legislation support levels averaged somewhat higher than in 1947, as a result of advances recorded in the prices paid by farmers. Two main purposes justified price supports in the war years and continuation of them for a limited period thereafter: (1) The necessity to encourage selected high production; and (2) the desirability of enabling farmers to change over subsequently in an orderly and gradual way from wartime to peacetime patterns of production. In addition to the supports authorized for basic and Steagall commodities, the legislation permitted support for other commodities when feasible. Although supports have been available for many commodities since 1941, support activity has been very limited because actual prices have exceeded supports in most instances.

In June, just before it adjourned, the Congress passed a bill (H. R. 6248) which extended the price supports for another year on the six basic commodities (cotton, wheat, corn, rice, tobacco, and peanuts); on milk and its products; on hogs, chickens, and eggs; and on Irish potatoes harvested before January 1, 1949. The support level for the above-named commodities is to be 90 percent of parity or the comparable price. On other Steagall commodities the support level is to be not less than 60 percent of parity, nor more than the 1948 support level. On Maryland tobacco under this legislation the parity base period becomes 1936–41.

Flexible price supports will take over on January 1, 1950. To replace price supports at 90 percent of parity for basic commodities, the flexible system authorizes supports variable inversely with supply. The authorized range is from 60 to 90 percent. Supports may be 90 percent of parity when the supply percentage is not more than 70; they may be 60 percent when the supply percentage is more than 130. If marketing quotas or acreage allotments are in effect, the price supports are increased 20 percent, though not to exceed 90 percent of parity. Also, the legislation provides for the so-called modernized parity calculation to recognize changes that have taken place during the last 30 years or more in the relationships among agricultural commodities.

Portents of Change in Agricultural Situation

Broadly, the agricultural situation in the United States did not change greatly in 1948. Production at high levels, for a tremendous home demand supplemented by export requirements close to the high levels of the previous year continued to delay the conversion of crop and livestock systems to peacetime patterns. Almost everything produced on United States farms moved into consumption, either at home or abroad, at prices not much different from those of 1947. Potatoes, eggs, and some fruits were about the only exceptions. However, it was obvious that the demand would not remain equally strong indefinitely and that eventually continued high production would generate marketing difficulties. In fact the world food shortage was lessening already and sharply pointing up the problem of finding markets for some crops. For example, it became necesary for this Department to do some limited support buying of eggs. Potatoes continued to be a problem; citrus and dried fruits were in surplus.

More serious problems lay ahead. Grains in particular were not immune from surplus possibilities, despite the continuance of world requirements above world supplies. Our exports of wheat with production at the recent level must exceed 300,000,000 bushels annually to utilize the whole quantity available above domestic needs. Our exports of wheat in the past 20 years have averaged less than 150,000,000 bushels a year. Corn was potentially a problem in 1948 after the harvest. Previously we had an insufficient supply; yet corn was liable quite soon to become a surplus crop, because the production was higher than before the war, with the number of livestock in a long decline. These facts were not cause for any immediate alarm. They reminded us, nevertheless, that we had some agricultural surpluses already, and others in the making. Surplus problems call essentially not for the restriction of the output, but for the maintenance and expansion of demand. Along this line we should emphasize research and action.

Arrears of Conservation

Our high production involved some neglect of conservation. It drained irreplaceable resources and worsened the prospect for permanent agricultural abundance. Programs in operation helped to lessen the wastage, but under the prevailing conditions could not achieve maximum efficiency. Farmers continued to sacrifice conservation for the sake of current production, and arrears of conservation work piled up. Conversion to peacetime farming when it finally gets under way must include greatly increased emphasis on conservation. Fortunately, current work stimulates conservation practices widely and affords a basis for progress in the years ahead.

Conservation programs include financial assistance by the Government to cooperators in land-improvement operations. They encourage farmers to carry out practices planned by technicians. Each year demonstrates a twofold benefit: (1) The programs conserve soil, water, and desirable vegetation extensively; and (2) they result in increased crop yields per acre and in that way prove that they deserve a place on every farm independently of Government help. Some features of the conservation programs require mention here although the subject will receive attention in other parts of this report.

Various Land Use Developments

Outstanding in interest and importance is the growth of soil-conservation districts—local units of government organized and managed under State laws. These districts transcend local government bounds and, with financial and technical assistance provided by the Government, bring extensive areas under treatment. In 1947 the conservation districts comprised about 700,000,000 acres, or two-thirds of the Nation's farm land. Plans developed applied to more than half a million farms or to approximately 160,000,000 acres of land; nearly half of which was already under treatment. An additional 36,000,000 acres of land received conservation treatment under other public programs. Farmers and ranchers in the conservation districts cooperated with technicians in preparing nearly 121,000 individual-farm conservation plans. Programs included group drainage, flood control, irrigation, and other means of protecting soil.

Part of the Nation's land-utilization program concerns submarginal farm land. For example, about 7.5 million acres of such land have been delineated in 81 different areas, chiefly in the southern Great Plains. Farmers use this land chiefly for grazing. In 1947, as the result of reseeding and other development operations, nearly 90 percent of the area was profitably in use. Such operations have added more than 200,000 acres to the area's grazing land since 1925. Conservation work is under way also on public grazing land. Millions of acres in the Great Plains require protection to maintain forage, conserve soil, reduce erosion, and control floods. Current range-improvement work includes the development of springs, reservoirs, and trails, the construction of fences and canals, and the provision of cattle guards.

Flood-control and drainage projects are in progress with local operators and public agencies interested jointly. With the help of tractors and other machinery, individual farmers are undertaking land developments and land improvements, such as formerly would have been beyond their power. By such means they are developing from 1 to 1½ million new acres of cropland every year, principally through clearing, draining, and irrigation. This is not wholly net gain. Land is simultaneously going out of agriculture to provide town sites, space for industries, roads, airports, flood-control facilities, and other useful things. But along with public land development projects, the land-development operations of the farmers provide an appreciable additional crop area each year. Some 153,000 acres, most of it in private ownership, obtained a full or a partial water supply for irrigation during 1947 for the first time, as the result of Federal reclamation projects. Other reclamation projects will supply water to about 285,000 additional acres.

Programs for Nutrition Improvement

Programs such as the school-lunch plan, the enrichment of white flour and bread with vitamins and minerals, the better combination of foods in the average diet, and increased nutrition education, are vitally important. A survey in 12 Southern States where supplies of fresh fluid milk were small showed that about 40 percent of the school lunches did not include milk. Accordingly, this Department provided nonfat dry-milk solids. Four schools in milk-deficit areas in each of eight States received dry-milk solids for use as a reconstituted beverage. About 80 percent of all the children drank and liked this product. Among children not accustomed to fresh milk the percentage was nearly 100. As a result, school-lunch authorities are making nonfat milk solids available extensively for beverage use in schools where enough fluid whole milk is not available.

UNITED STATES FARMERS IN THE WORLD ECONOMY

Our farmers cultivate about 360 million acres of cropland—about one-seventh of the world's total. Besides providing abundantly for the American people, they furnish large quantities of food and other products for export. In two world-war periods they produced the largest blocks of freely disposable foodstuffs. Two-thirds of their crop acreage, along with considerable range and pasture land, supports livestock. This is the best proof of our agricultural abundance. Certain other countries find livestock raising expensive or prohibitive on a large scale. They cannot step down, so to speak, in order to enlarge their supply of eatables; they are on bedrock already.

American farmers supply rising domestic demand, provide liberally for exports, turn out a food supply rich in vitamins and minerals as well as calories, and in the form of an unrivaled livestock industry maintain a priceless national food reserve. Under pressure this Nation could greatly curtail its livestock raising and consume greatly increased quantities of cereals directly—a choice to which, of course, we hope never to be forced. Nevertheless, the power to do so is a vital element in our food security. As mentioned, countries already on a cereal basis have no such choice; their population presses on an agricultural system pushed already to the limit of their technical and material resources. In the United States, with large resources still untouched, we produce abundance on a relatively costly unit basis, under conditions flexible enough for almost any conceivable emergency.

Industry's Part in Agriculture

Needless to say, the productivity of American agriculture is partly an industrial phenomenon. The growth of industry in the United States provides agriculture with transport, machinery, fertilizer, and other supplies, and also with a huge domestic market. Agriculture today is a smaller proportion of the country's economic establishment than it was formerly; but it is greater in absolute magnitude and also in production. It is not the rival or competitor but the partner of industry, as shown conspicuously by the extent to which it uses machinery. Substitution of machine power for animal power enables American agriculture to grow food on some 55 million acres of cropland once needed to produce feed for horses and mules.

Moreover, the mechanization improves the speed and the timing of farm work. Aided by innumerable uses in the processing and distribution of farm products, machinery on farms involves agriculture deeply in the industrial system and at the same time releases rural manpower for industrial employment. With industrial requirements mounting, this helps both town and country. Even with industrial requirements declining, as happens periodically, the importance of industry to agriculture continues. In fact it is greater then. Without industrial recovery agriculture must carry its own excess manpower and some unemployed urban labor, too. Meantime, farm productivity continues to increase. Briefly, agriculture in periods of depression has surpluses both of commodities and of manpower; it has an unsolved problem of abundance—a problem which it shares with its urban partner.

Actually, agriculture and industry are not separate entities but dual aspects of one thing—the modern industrial economy with its dependence on science and on steam, electricity, and oil. We cannot prescribe for agriculture and industry separately when their ailments need attention. They need joint treatment. Agriculture has a special farm program the purpose of which is to make such that agricultural prices do not again decline relative to nonagricultural prices as much as they did shortly after World War I and again after 1929. But the farm program by itself cannot accomplish that. Farm production, farm income, and farm prices depend on consumer buying power, which depends in turn on employment not only in the United States but throughout the world. In a bad depression purely agricultural policy could not hold farm prices at anywhere near a paying level. Even partial price support under such conditions would require a reduction in the farm output. With people out of jobs and consumer incomes down, the farm problem would have largely an urban cause. Meantime, low farm prices would harm city business and employment. Agriculture's achievements in production change into liabilities when the Nation's nonfarm employment and buying power collapse. Crops and livestock cease moving properly to their intended destinations, and with bins and granaries overflowing the illusion recurs that production has become excessive.

Our huge farm output is only a small part of the world's total—a truth sometimes overlooked. With about 6 percent of the world's population, the United States produces, depending on how it is calculated, between 11 and 14 percent of the world's food. If we regularly exported as much as 10 percent of the farm output, a generous percentage by normal peacetime standards, the effect on the world's average dietary would still be small. Our food helps the world nutrition, especially in times of crises; it is a valuable supplement to national dietaries in many countries under normal conditions. Moreover, as the world wars have shown, it is a weapon for freedom. Geared to large production for export, farmers wonder what will happen to their interests when world agriculture recovers. Possible growth in the world's farm output need not worry them. Improvement in the world's agriculture should actually benefit American farm exports, provided the improvement means growth of world purchasing power, rather than strait-jacket economic nationalism. Reviving multilateral trade is demonstrating this already. In rational patterns of world trade, as experience has shown repeately, expanding farm production both here and throughout the world does not lack buyers. Surpluses piled up between the wars, to be sure; but the world was busy then in strangling trade.

Foreign Conditions That Affect United States Farmers

Nonfarm conditions that determine agriculture's prospects are of course foreign as well as domestic. Food consumption in the United States, even assuming substantial improvements in our diet, could not currently provide a sufficient market for the farmers. This country has long exported cotton, tobacco, wheat, rice, certain fruits, and some other farm products. It continues to need an agricultural export market. Exceptional world import requirements plus the European Recovery Program provide such a market for the time being. But our longer-run problem is to build a permanent basis for satisfactory exports. Permanently satisfactory export trade requires a stable military peace and then a basis for reciprocal trade.

Within that framework, the United States with advantage to itself may encourage and promote farm production abroad, through scientific knowledge and adoption of efficient farm practices. Such a policy would not hurt our exports. Countries able to benefit from it for the most part are not our customers. Better farming in such countries would raise their living standards and make them larger buyers of nonagricultural goods. Simultaneously, the United States would push its farm exports in its traditional markets and elsewhere through international action calculated to promote a world increase in production of all kinds. Such over-all economic growth benefits countries like ours, with high initial production, as well as countries at present on the bottom rungs of the production ladder.

Progress in Europe

Production in 1948 of bread grains in Europe, not including the Soviet Union, was some 35 percent higher than in 1947. Crops were good also in the Soviet Union. Nevertheless, bread-grain production in Europe was still some 13 percent below the average for the prewar years 1935–39, though meantime Europe's population had increased about 4 percent (in the ERP countries 8 percent). Livestock numbers over most of Europe were greatly below the prewar average. It is obvious that even with full economic revival the people of Europe would want considerable quantities of American food and other farm products—in some lines more than they receive now. With mass starvation prevented, diets in Europe must nevertheless be raised substantially, for reasons both of health and of economic efficiency. In the 1920's, with much of Europe bent apparently on self-containment, our farm exports to Europe were large; for example, in the years 1925–29 Germany alone averaged nearly $300,000,000 annually in agricultural imports from the United States. Large United States farm exports to Europe should be dependably attainable again. Western Europe is so heavily industrial that it will need food imports to some extent—perhaps permanently; and the United States is one of the best sources of supply.

Assistance to Oriental Countries

Emphasis will gradually shift from Europe to countries elsewhere that are hungry. Food crises, as the term implies, do not continue. As mentioned, the crisis in Europe is moderating—from domestic farm recovery plus increased availability of food imports. Moreover, normally Europe can get farm products in exchange for its production of nonfood goods and services. Food problems are different in the Orient; shortages in India, China, and similar mainly agricultural regions chiefly reflect lack of up-to-date farm technique and farm facilities. Pressure of population upon the land is heavy in such countries; but the remedy is not necessarily depopulation. Part of the remedy is industrialization, which would diminish land crowding, facilitate an increase in the size of farms, provide farmers with transport, machinery, and markets, and bring into cultivation land that would not pay with only hand labor to work it.

In the Orient, as in Europe, the United States can help in overcoming hunger, with a contribution both industrial and agricultural. Our contribution to the Orient might especially feature the shipment of industrial rather than farm products, as a help to the modernization of oriental farming. The resulting improvement of farm techniques in the Orient would benefit United States farming through roundabout yet certain processes thoroughly familiar to students of world commerce. Specifically, the shipment of American industrial goods to the Orient would boost all types of production there, and at the same time create a new demand for world products. Enhanced farm output would provide oriental countries with buying power. This new farm production would not be highly competitive with American farm production since it would rest on different natural advantages. Consumed for the most part in the countries of its origin, but exported to some extent as payment for necessary imports, it would mean better trade for all the world.

THE WORLD FOOD SITUATION

Prospects at the beginning of the 1948–49 season for meeting the world's food needs were brighter than at the beginning of any of the preceding postwar years. The greatest indicated improvement was in Europe. Crop conditions there pointed to materially larger supplies than those obtained from the unusually poor harvest of 1947.

Bread-grain crops in Europe promised to total at least one-third larger than last year's, and conditions in midsummer 1948 were favorable also for potatoes, sugar beets, root crops for fodder, and other late crops. Hence European countries will be able to improve their diets and to resume disrupted livestock-rehabilitation programs.

Nevertheless, the food production of the Continent is still somewhat below that of prewar years. The countries of western Europe, moreover, are more dependent upon food imports than they were before the war though even in the 1930's this area imported about one-third of its food supply. Crop prospects in the countries of eastern Europe, which normally have crop surpluses, are much better than a year ago.

The relatively favorable European crop outlook reported in the first half of 1948 continued through July. Warm and sunny weather followed prolonged rains and cool weather in late June and early July in almost every European country. Grains suffered only slightly in the cool damp spell, while potatoes, root crops, and pastures benefited.

Wheat production in Europe (excluding the U. S. S. R.) promised to reach 1,450 million bushels, as compared with 1,015 million bushels in 1947 and a prewar average of 1,588 million bushels. Harvesting of small grains progressed rapidly under favorable conditions in most parts of the Continent. In the U. S. S. R. total grain production was expected to be not much different from that of 1947, but increased potato production was expected.

In continental Europe and in the United Kingdom good crops of early potatoes helped food conditions and prospects for the main potato crop were generally favorable. Root crops were mostly in good condition. Production of potatoes, sugar beets, and fodder roots promised to be much larger than in 1947, with potato output not far short of the 1935–39 average of 4,852 million bushels. In 1947 the output of potatoes in Europe (excluding the Soviet Union) totaled only 3,781 million bushels.

Production of vegetable oils in Europe may increase little if at all over that of 1947. The oilseed harvest promised to be better but the outlook for olives was poorer. Production of olives in 1947, however, was unusually large. Scattered reports indicated good vegetable crops and below-average legume and fruit production in several countries. In many areas the first hay crop suffered damage by rain. Pasture conditions over large parts of the Continent, however, were good to excellent.

Crops in Surplus Countries

Food-production prospects in other parts of the world are less certain as yet. Total production in North America may not differ much from that of 1947. North America is harvesting a record crop of feed grains, which will permit some expansion in the production of livestock. Its output of food crops, particularly wheat, will be below that of 1947. The Soviet Union has reported another favorable harvest. Crop conditions in the surplus-producing countries of the Southern Hemisphere were about average at the beginning of the 1948–49 season. Hence their production may not equal the unusually high levels reached in 1947–48. Gradual improvement in agricultural production continues in the Orient but detailed information about the growing crops in this area is not yet available. Normally, on a food-export basis, the Orient as a whole is likely to remain a net importer for some time, with the United States providing a large share of the import requirements.

Food Conditions in the Orient

Despite its improved food production, the Far East continued in 1948 to be a large net importer. Rapidly increasing population, due both to repatriation and to a high birth rate, made Japan especially dependent on food imports, largely from the United States. Shipments to Japan included sugar, soya flour, and dried fruits, as well as cereals. Food production increased in South Korea but the need was far above prewar level owing to population growth. It was estimated in 1947 that South Korea's population had increased about 25 percent in the preceding 2 years, partly from the repatriation of over 1 million Koreans and partly from an influx of another million from North Korea. This area, a net food exporter before the war, requested nearly 400,000 tons of food imports for 1948 to maintain a 1,550-calorie daily ration for its increased population. In China the distribution of food was poor because of civil war, inflation, shortage of transportation and general economic chaos, and China suffered acutely though in 1947–48 it harvested good food crops. Pending availability of Economic Cooperation Administration funds, shortage of foreign exchange prevented China from taking advantage of small allocations of rice. Agricultural production in the Philippines, Formosa, and the Netherlands Indies remained below prewar level, especially in sugar. Yet sizable exports, the first from these countries since the war, were made in 1948. Large exports of copra from the Philippines helped materially to relieve the world shortage of fats and oils. Exports of oil products from the Netherlands were still far below the prewar average.

Food problems in India increased following partition of the country and drought in the Madras area. The food supplies of domestic origin for 1947–48 were about as large as in the previous year. Increased imports of wheat from Australia and rice from Burma enabled the Government to maintain rations in most areas. Rationing was restricted, however, to the larger cities, and price control was greatly reduced. Hence food prices advanced sharply, with increased difficulty for the poor and reduced consumption generally. Rice production in Burma and Siam, though above that of the war years, was still far below prewar. In French Indo-China civil disturbances restricted production and trade. Exports of rice from these three countries were far below prewar.

World Food Supplies for 1947–48

Early in the 1947–48 consumption year the Emergency Food Council surveyed world food needs. Importing countries estimated their import requirements for cereals (excluding rice) at about 52 million long tons, nearly 40 million tons in bread grains and the rest in coarse grain. Corresponding statements in 1946–47 estimated world import requirements of cereals at only 37 million long tons. The increase partially reflected the hopes of people in war-torn countries for better diets and partly the desire of farmers to revive their livestock industries. Unfortunately, the import requirements exceeded export availabilities. At first it seemed unlikely that more than 32 million long tons of grains would be available for export—3 percent above the previous year's shipments but less than 61 percent of the stated requirements.

Hungry countries faced continued efforts to lessen food waste, increase domestic food collections, and turn more farm production into food. They faced possibility of stricter rationing, higher flour-extraction rates, increased use of coarse grains and of flour in the bread mix, postponed rehabilitation of the livestock industries. Increased food use of products normally devoted to livestock or to other nonfood uses caused food supplies to decline less than farm production. But under that regime standards of living declined.

Many countries reduced their rations and rationed additional commodities. Steps taken varied with production, stocks, buying or borrowing power, and food controls. France, the Netherlands, and the United Kingdom, which suffered drastic deterioration in their food-supply position, took strong action for the consumption year 1947–48. France reduced bread consumption, increased the flour-extraction rate, and obliged bakers to mix coarse grain liberally with wheat. The Netherlands reduced its bread, milk, and cheese rations, but increased the meat ration. In Britain bread rationing became necessary for the first time. Also, Britain reduced the rations of meat, milk, chocolate, and sweets, lessened the allocation of sugar to industrial users, and even rationed potatoes.

Some Relatively Fortunate Areas

Food consumption changed less in some other countries. Belgium maintained its bread ration and derationed meat; Switzerland did likewise but lowered its milk ration. Eire, the only country of western Europe with a larger harvest in 1947 than in 1946, increased its food consumption, though not to the prewar level. Scandinavian food supplies from domestic sources for the most part were smaller than in 1946–47. Denmark and Sweden reduced bread rations slightly. In order to boost exports, Denmark rationed meat and decreased its butter ration. Finland, because its crops were comparatively good, maintained its fats and sugar rations, while Norway kept its bread ration unchanged.

Conditions in Central and Eastern Europe

The food situation in central and eastern Europe worsened. Czechoslovakia, normally almost self-sufficient, had to ration bread, potatoes, milk, and sugar. Bizone Germany had smaller indigenous supplies, offset by larger food imports. Rations were not always fully met, though they were kept above those of 1946–47 and gradually improved in the spring months of 1948. Consumption in Bizone Germany, including food obtained in the free and black markets, provided the urban population with 2,000 calories per person per day. Consumption by the nonfarm population was about the same in the French zone of Germany. In the Soviet Union it was somewhat lower. With larger imports, Austria's consumption rose a little, especially in the spring months. The food situation in Poland improved, from increases both in domestic production and in bread-grain imports.

In the Mediterranean countries (Greece, Italy, Portugal, and Spain) average daily nonfarm consumption was 2,000 calories or more. Bread rations were lowered in Spain following the poor wheat harvest of 1947. Portugal fared better; bread rations there, toward the end of 1947, were above the previous year's level. Italy maintained its bread ration for normal consumption and increased its rations of corn flour and of alimentary pastes. Moreover, olive oil became sufficiently abundant in Italy to make further rationing of this commodity unnecessary. Supplies of sugar and of other important foodstuffs rose and Italian consumers were better off than during the previous year. In Greece the food supply was large enough to provide more than the previous daily average of 2,200 calories for the nonfarm population but warfare interfered with distribution.

Consumption Year Ends With Improvement

As the 1947–48 consumption year progressed, improvement in world food crops helped to close the gap between import requirements and exportable availabilities. Most European countries were able to increase their rations. A record wheat crop in Australia along with above-average production in Argentina and in the Union of South Africa, permitted some increase in food imports from the Southern Hemisphere. Mild weather enabled European countries to maintain more livestock, and this, together with an early spring, resulted in somewhat larger supplies of dairy products.

Exports of food and feed products from Russia were larger than had been estimated in the fall months. Favorable crop conditions for winter wheat in the United States together with careful utilization of wheat supplies, enabled this country also to export more food grains than had seemed possible. By June 1948 most of the reductions in European rations had been replaced and rationing of certain commodities discontinued. Favorable 1948 crops presaged continued improvement in rations. However, even with better crops and large imports, per capita food supplies in food-deficit countries will still be somewhat below prewar levels; moreover, the quality of the diet will be low because of the shortage of dairy products, meats, and fats.

EUROPEAN RECOVERY PROGRAM

The principle of the European Recovery Program was stated by Secretary Marshall in June 1947, and was an extension of the Truman Doctrine as originally applied in Greece and Turkey. Shortly thereafter, representatives of 16 nations of western and southern Europe met in Paris to develop a cooperative recovery program. It became evident that such a program would make heavy demands upon some sectors of the United States economy and that an appraisal of our ability to carry it through was essential before we embarked upon it.

Consequently, on June 22, the President announced the creation of three groups to study the relationship between any further aid which we might extend to foreign countries and the interests of the domestic economy. (1) An interdepartmental group under Secretary of the Interior Krug was directed to study the effects of a program of foreign aid upon our national resources, including exhaustible *natural* resources. (2) The Council of Economic Advisers was to study the impact of foreign aid upon the general economy. (3) A nonpartisan committee of distinguished citizens, headed by Secretary of Commerce Harriman, was requested to determine the facts with respect to the character and quantities of United States resources available for economic assistance to foreign countries, and to advise the President, in the light of these facts, on the limits within which the United States might safely and wisely plan to extend such assistance.

The conclusion of the Krug Report was that the United States economy could support such a program of foreign aid during the next 5 years. However, important supply problems were found in the case of wheat, nitrogen, fertilizers, coal, steel, and certain classes of industrial equipment.

As to resource drains, the report concluded that in the case of land and forest products there was a basic and continuing conservation problem which was largely independent of the proposed foreign-aid program. The specific effects of a foreign-aid program upon the depletion of natural resources would be rather limited, particularly if confined to a 4- or 5-year period. In the case of land the chief short-run impact noted related to wheat in the Great Plains, where the dangers of overplanting and the possibilities of wind erosion in the event of unfavorable weather were stressed.

The Council of Economic Advisers concluded that even if the stated import requirements of the 16 European countries were met in full, total United States exports in 1948 would not exceed the record rates of early 1947. After 1948, net exports would taper off and the inflationary pressure would be reduced. These facts led them to the conclusion that the general impact of a new foreign-aid program could be sustained because a larger impact had already been sustained. However, specific inflationary dangers were found in the cases of food and steel. The major lines of action suggested were export controls, and allocation for domestic use; also conservation measures and the curbing of speculation.

The Harriman Committee concluded that it was vitally important for the United States to assist in the economic recovery of western Europe for economic, political, and humanitarian reasons and that the 4-year program outlined had a good prospect for success. It found that, in general, the requirements submitted by the European countries for food, fuel, and raw materials were reasonable and should be met so far as practicable.

Appraisal of Our Export Capacity

In appraising our capacity to supply food, the Harriman Committee concluded that with average weather during 1948–51 the United States would probably be able to export only about 10 million tons of grain yearly, compared with nearly 15 million tons in 1946–47. The Committee pointed out the danger of one or more years of weather unfavorable to wheat in this country and stressed the importance of increasing food production in the European countries themselves and in the areas which had supplied them with grain, fats and oils, and other foods before the war.

In the case of food other than grains the Harriman Committee concluded that the high 1946–47 rate of exports in the aggregate could be maintained. Exports of certain comodities could even be increased, although others would decline. The Committee also made recommendations as to exports of fertilizer and farm machinery.

Technical people in the Department of Agriculture were consulted in the preparation of these reports, and particularly in the appraisal of our capacity to export farm products. The results of this appraisal were reflected in an estimated schedule of agricultural exports from the United States which was submitted to Congress in connection with the European Recovery Program. This schedule called for an export of 250,000,000 or more bushels of wheat and about 100,000,000 bushels of coarse grain annually through 1951–52, compared with exports of only slightly more than 100,000,000 bushels of all grains during the five prewar years 1933–34 to 1937–38. These same schedules also called for somewhat greater exports of tobacco than moved before the war, considerable quantities of dried fruit, and about 3,500,000 bales of American cotton annually. The grain figures reflect estimated capacity production under average weather conditions. The figures for tobacco and cotton reflect something less than capacity production, due to expected limitations of export demand.

High Production Needed for Several Years

In general, the European Recovery Program will require continued high food production in the United States for the next 3 years. Demands will be heaviest upon our grain-producing areas. The program probably will not have much direct effect on some of the more expensive or more perishable agricultural commodities. Exports of cotton, tobacco, and various specialty products may be below our full capacity but they will be much greater than would be possible without the recovery program.

Finally, the European Recovery Program should lead to a self-supporting European market for our farm products following the program period considerably larger than could otherwise be expected. In the past, some 60 percent of our agricultural exports have gone to Europe. Europe will continue to need large exports from the United States if it is to regain its prewar consumption standards. Over the long pull, however, Europe can pay for our products only if its own economy is vigorous and thriving.

Farm Products in ERP

Farm products may constitute more than one-third of the value of the exports that the United States will send in 1948–49 to the countries included in the European Recovery Program.

This estimate has grown out of an analysis made by this Department in cooperation with the Departments of State and Commerce, on the basis of information furnished by the Committee of European Economic Cooperation in September 1947. That Committee obtained statements of estimated needs from countries that expressed a desire to participate in the European Recovery Program. In the closing months of 1947, officials of the Departments of Agriculture, State, and Commerce studied those stated requirements, country by country and commodity by commodity. They found stated food needs to be "reasonable and conservative."

In prewar years western Europe as a whole produced only about two-thirds of its food and imported the rest. Some of the countries were extremely dependent on imports. Thus, the United Kingdom was only one-third self-sufficient in food; western Germany about 60 percent; and Belgium, Norway, and Switzerland each about 45 percent.

Western Europe's need for food imports is greater now than it was in prewar years because its food production is smaller and its population larger. Moreover, the supply available from some major prewar sources of supply has diminished.

Analysis of western Europe's stated needs, of its production goals, and of its import prospects, indicates the diets of the people during 1948–49 will continue to be below the prewar level. Nevertheless, these diets will show marked improvement over those of 1947–48. Need, of course, is only one element in the situation. Purchasing power is important. Much importance attaches also to the quantity of food available for shipment to ERP countries in 1948–49. This depends partly on the supply in food-exporting countries, partly on the needs of food-deficit areas elsewhere than in Europe, and partly on the competing industrial requirements of the ERP countries. The industrial program of these countries makes demands on their supply of dollars.

When the first appraisal of European food needs for the 1947–48 consumption year was made in the fall of 1947, it was evident that the total quantity of food available for export over the world would be well below prewar levels. Many food-export countries were striving to overcome the effect of recent crop failures; others were still suffering from war-caused handicaps. Moreover, world supplies of food for export could not go exclusively to ERP countries. Many other food-importing areas were in the market with sizable requirements. Hence this Department and the cooperating executive agencies had to scale down the estimates of possible exports to ERP countries, especially exports from the Western Hemisphere.

These reductions involved such basic foods as bread, grain, coarse grain, rice, fats and oils, meat, and eggs. This was unfortunate from many standpoints, notably in view of the poor prospect for recovery in Europe's production of livestock products. It was, nevertheless, unavoidable. The ERP export program as originally proposed by this Government in the fall of 1947 was as large as potential supplies justified.

But in the spring and early summer of 1948 the outlook improved somewhat. The harvest in western Europe promised to be considerably larger than it was reasonable to expect last fall. In fact the outlook indicated the largest harvest since the war, though still not up to the prewar average. Our own crop prospects again were excellent—as were those of some other food-exporting countries. Accordingly, the Department in March and again in May 1948 revised its food-availability estimates for western Europe with a major increase in the grain figures and slight increases in other food items. Nevertheless, most items remained below the quantities needed to fulfill Europe's stated import requirements. Our reappraisal of western Europe's position in the light of both its own improved crop prospects and the somewhat liberalized import estimates indicated that in 1948–49 the diet available would still remain below prewar level.

There is another element in the problem. Permanent solution of Europe's food difficulty requires more than good harvests throughout the world. It requires substantial soundly financed food imports into Europe's food-deficit areas. Such financing presupposes a revival in Europe's export trade, especially in manufactured goods. This, too, is an important ERP objective—to be promoted partly through credits and shipments for industrial-recovery purposes. In proportion as it succeeds, this program will help Europe to get food from a variety of sources as well as from the United States. Briefly, the program will help western Europe to buy food rather than just to get food as a relief contribution.

Restoration of such trade is, in fact, already beginning. It is evident, for example, in shipments of grain from Argentina to Europe. During part of the 1947–48 crop-year these shipments moved at more than twice the monthly rate of 1946–47. Currently, however, monthly grain shipments are again at a low level. Western Europe is also getting some grain from eastern Europe and from the Soviet Union in return for manufactured goods and other nonagricultural products.

It was assumed in planning the European Recovery Program that food shipments from eastern Europe and Latin America—as well as from the Far East—would gradually increase as the program progressed and more manufactured goods became available for export from eastern Europe.

How much food does the United States expect to supply to western Europe? It now appears that in 1948–49, the first full year of the European Recovery Program, total food exports from the United States to ERP countries will probably be somewhat more than those of recent years.

A part of the increase will be in grain, particularly corn and other coarse grains for feed. It is now estimated that the United States will have available for the ERP nations in 1948–49 about 10 percent more grain than the 10.5 million long tons furnished those nations last year. It seems likely that, as in preceding postwar years, the United States will again supply approximately half the total grain moving in world trade, as compared with an average of less than 5 percent in the prewar years 1934–38.

Fats and oils are another food item which is unusually scarce in western Europe. Though the world supply of these items remains tight, it is gradually improving. Availabilities from this country for the ERP nations, as well as for the rest of the world, appear to be 10 percent below the quantity exported in 1947–48; exports of fats and oils to ERP nations may be only half the quantity shipped in 1947–48. In the current year, in fact, we may import more fats and oils than we export, as we did before the war. However, the United States supply of oil cake and meal has improved slightly in recent months, and we expect to be able to increase our shipments of these products to the ERP nations.

Because meat supplies in the United States continue to be short we do not plan to send any meat to the ERP countries next year other than some horsemeat. Our shipments of meat to other parts of the world will be small—only about six-tenths of 1 percent of our production. Even with the good corn crop, it will take many months to relieve our present meat shortage.

Sugar has moved into the "adequate supply class." Our production of peas and beans, particularly of peas in the Pacific Northwest is adequate for the demand. In dairy products, eggs, and certain fresh and dried fruits, we have seasonal surpluses and in some cases year-round surpluses. Our citrus industry could supply a much larger export market than it has. Large quantities of nonfat dry milk powder are available for export. Cotton, tobacco, timber, fertilizer, and farm machinery are also part of the agricultural picture.

Exports of United States cotton to ERP nations in 1948–49 may be only about three-fourths of the prewar amounts. However, western Europe's cotton consumption is down, and under the planned exports the United States would retain about the same percentage of that market as it had before the war. Our tobacco shipments to the ERP nations in 1948–49 are expected to be somewhat larger than prewar averages but about the same as in recent years. These shipments will, for the first time since the war, include some United States tobacco for Germany.

Certain timber products are important to Europe; it needs timber for mines, railroads, and factories. The United States plans to export to western Europe slightly more timber than it sent there before the war, though the amount would be less than 2 percent of our production.

Europe's soil was badly depleted of plant food during the war. Nitrogen is the most important current shortage. Most of Europe's nitrogen supply will come from its own production and from sources other than the United States. The ERP calls for United States shipments of nitrogen to western Europe for the next year at about the present rate, and also for shipments of phosphate rock at about the present rate, which is less than one-third of our prewar exports to those countries. No potash shipments are included in the program.

Some United States farm machinery will go to ERP countries. Furnished in the kinds and quantities suited to agricultural conditions there, it should boost farm output considerably. Machinery by itself cannot solve Europe's food problems; probably it cannot increase Europe's food output proportionately as much as machinery has increased farm production recently in the United States and elsewhere. But it is nevertheless an important element in European recovery.

In the later war years the production of farm machinery in western Europe dropped heavily; in Germany it came to a stop. Farmers could not get spare parts, not to mention new machines. Hence, the capacity of ERP countries now to absorb farm equipment is great.

Percentagewise, great expansion in tractor numbers has taken place in some European countries. Britain has five times as many farm tractors as before the war. France, Germany, Austria, Greece, and several other countries have about twice as many. Except in Britain, however, tractors in these countries are still not numerous. Some European nations have plans to expand their manufacturing of farm machinery. Meanwhile, the United States plans, in 1948–49, to double its machinery exports, though the increased amount will take less than 10 percent of our production and will be more than offset by expanding plant capacity.

Operations under the European Recovery Program have been in progress for over 3 months. When legislation for the ERP was approved on April 3, 1948, the need for action was urgent. Food supplies in many countries was running low. This Department had had previous experience, both in war and in peace, in the business of procuring and shipping food, and the Economic Cooperation Administration authorized it to continue certain phases of the work. In consequence, shipments of agricultural products got off to a quick start and bulked large in the first quarter of ERP exports. Quantitywise, grain shipments in April through June averaged about the same as in the other three quarters of the 1947–48 years. Germany, France, and Italy received the largest amounts.

It is expected that this first year of the ERP will be the only year under that program in which agricultural products will constitute as much as a third of the total value of United States shipments to the ERP nations. However, food from the United States will continue to play an important part throughout this program.

On the other hand, the European Recovery Program means much to American agriculture. It is providing a continued strong foreign market for United States agricultural products. It is also helping to establish a long-time self-supporting market in western Europe—an area which has traditionally taken more than two-thirds of this country's agricultural exports. But over and above this, it is improving the prospects for a sound and lasting peace.

RECORD U. S. EXPORTS IN 1947–48

Total United States food exports of 19,347 thousand tons in 1947–48 were slightly larger on a tonnage basis than during the preceding fiscal year, and about 11 percent above the exports in the first postwar year, 1945–46. Exports of cereal products including rice totaled 15.7 million tons, 0.5 million above the 1946–47 level. This increase was a little more than enough to offset a small reduction in the exports of livestock products and other foods.

Grains with rice included accounted for about 81 percent of the export tonnage. Wheat and wheat products represented 67 percent; the other grains, 12 percent; and rice, 2 percent. These products were a larger proportion of the exports than in the two preceding fiscal years, partly because supplies were large and partly because European countries tried to conserve dollars by purchasing the low-cost but high-calorie grains. Grain shipments abroad were restricted to food and seed uses.

Exports of wheat and wheat products (grain equivalent) at 13,018 thousand tons or 468 million bushels in 1947–48 were the largest on record. They were almost 10 times the annual average for 1935–39. Exports accounted for almost half the United States distribution of wheat for food in 1947–48. The large wheat supply permitted a shift from coarse grains back to wheat and wheat products.

Exports of corn and corn products in 1947–48 amounted to a million tons (grain equivalent), only a third of the 1946–47 rate. They represented about 30 percent of the total distribution of corn for food. Out-movement of barley, malt, grain sorghums, oats, oatmeal, rye, and rye flour totaled 1,234 thousand tons (grain equivalent)—slightly above the level of the previous fiscal year; two-thirds greater than in 1945–46; and about four times the annual average in the period 1935–39.

Exports in 1947–48 accounted for 54 percent of the total distribution of these grains for food. Rice exports of 407 thousand tons (milled basis) exceeded the previous record of 393 thousand tons established in 1946–47, and went principally to areas like Cuba and certain Far Eastern countries where rice is an important food.

Fats and oils exports of 251 thousand tons were about 14 percent above 1946–47 and almost three times the prewar (1935–39) average annual rate, though 19 percent below the 1945–46 level. An improvement in the domestic supply of vegetable oils made the export increase possible.

Reduced marketings, along with heavy United States civilian demand for meat and meat products, accounted for the relatively small quantity of meat exported in 1947–48. Meat exports at 68 thousand tons (carcass equivalent) were only a third of the quantity exported in 1946–47 and a tenth of the 1945–46 exports.

Exports of cheese and of canned milk and dried milk totaled 460 thousand tons. This was more than 10 percent below the total of the 1946–47 fiscal year and 44 percent under the 1945–46 total, though much above prewar exports. Exports of dairy products consisted mostly of canned milk and nonfat dry milk solids. Exports accounted for 37 percent of the dried milk and 16 percent of the canned milk distributed during the year. Nonfat dry-milk solids (dry skim milk) went to school children in Germany and Japan in a school lunch feeding program.

Aggregate exports of other foods—principally fruits, vegetables, potatoes, eggs, dry beans and peas, soybeans, and peanuts—amounted to 2,911 thousand tons—less in this category than in either of the two preceding fiscal years. Peanuts exported to Europe were crushed there for peanut oil. Exports represented almost 30 percent of the total United States distribution of dry beans and peas in 1947–48.

Destinations of the Exports

Most of the food exports went to countries in the European Recovery Program. These countries received 12,557 thousand tons, or 65 percent, of the total United States food exports. European countries not under the program received 1.4 percent; Far Eastern countries received 16.4 percent; Latin American Republics received 9.5 percent; Canada received 4.1 percent; other areas received 3.6 percent.

The U. S.–U. K. area of Germany received more of the exported foods than any other country. Germany obtained the largest quantity of wheat (3,720 thousand tons) of other grains and grain products (514 thousand tons), and of other foods (661 thousand tons). This area ranked third highest for fats and oils and also dairy products, with 35 and 44 thousand tons, respectively.

The Far East area under United States control (Japan, Korea, and the Ryukyu Islands) was the second largest recipient. Among the receipts were wheat and wheat flour (1,214 thousand tons), other grains and grain products (382 thousand tons), and other foods, mostly soybeans (364 thousand tons).

France and French North Africa received the third largest quantity—1,858 thousand tons. This total consisted principally of wheat and wheat flour (1,605 thousand tons) and other grains and grain products (141 thousand tons). The area received 37 thousand tons of fats and oils from the United States, and in this particular was the second largest recipient.

About 1,833 thousand tons of United States food went to the Latin American Republics. Wheat and wheat products totaled 903 thousand tons; other grains and grain products, 179 thousand tons; rice, 246 thousand tons; fats and oils, 66 thousand tons; meat, 10 thousand tons; dairy products, 55 thousand tons; and other foods, 374 thousand tons. Most of the rice went to Cuba, always a large market for United States rice.

Large quantities of food went from the United States in 1947–48 to Italy (1,619 thousand tons), Greece (775 thousand tons), Austria (766 thousand tons), and Netherlands (765 thousand tons), all of them participants in the European Recovery Program.

Belgium and Luxembourg ranked high among the recipients of United States foods. They obtained the largest quantity of dairy products—89 thousand tons. The United Kingdom received only 363 thousand tons of food, the smallest quantity since before World War II.

Meat exports of 23 thousand tons, approximately a third of the total exported in 1947–48, went to the United Kingdom.

Exports to Germany and the occupied Far East areas were principally under the direction of United States military agencies. Exports of food increased for civilian feeding in occupied areas. Such shipments in 1947–48 represented almost 29 percent of United States food exports. Exports in 1946–47 for civilian feeding in occupied areas accounted for more than 21 percent of the food exports and in the preceding fiscal year for about 18.5 percent.

The United States military exports to occupied areas were significant on a commodity basis in 1947–48. Wheat and wheat product exports of this type accounted for 28 percent of our total exports in that category; similarly, corn and corn products accounted for 24 percent; other grains and products for 43 percent; dried milk (principally nonfat dry-milk solids) for 32 percent; potatoes for 41 percent; dry beans and peas for 45 percent; processed fruits (mainly dried fruit) for 41 percent; soybeans and soybean products (excluding oil) for 74 percent; peanuts for 40 percent.

The Department of Agriculture procured more than 60 percent of the total food exports. Specifically, among the major commodities, the Department purchased about 78 percent of the wheat and wheat flour exported; about 28 percent of the rice; 40 percent of the other grains and grain products; 70 percent of the potatoes; over 80 percent of the nonfat dry-milk solids; about 70 percent of the dried fruit; more than 75 percent of the eggs; over 50 percent of the peanuts; and 35 percent of the dry beans and peas. Military or commercial agencies procured the rest.

FOOD AND AGRICULTURE ORGANIZATION

In its third year, the Food and Agriculture Organization of the United Nations has strengthened its organization, broadened its activities, and expanded its technical assistance to the 57 governments constituting its membership.

A major change was made during the year with the setting up of the Council of FAO. This development grew out of the proposals for a World Food Board made at the Copenhagen Conference in 1946 and the recommendations of the Preparatory Commission on World Food Proposals early in 1947. Amendments to the FAO constitution authorizing the change were approved by the Geneva Conference in September 1947. The Council was organized and held its first session in November 1947. It met in April, August, and November, 1948. It replaced the former Executive Committee, which acted as the governing body of FAO between sessions of the Conference.

Since the establishment of the Council, FAO has been able to keep the world food and agriculture situation under constant review. With its 18-nation membership geographically distributed to represent every region in the world, the Council speaks with the authority of governments in making recommendations for action.

Early in 1948 the functions of the International Emergency Food Council were transferred to the Council of FAO. International allocation of basic foods has continued without interruption.

In the new framework, the Central Committee of the former International Emergency Food Council became the International Emergency Food Committee, retaining the familiar initial letters IEFC. The same committees continued to meet under the new organization, making recommendations for international allocation of cereals, fertilizers, fats and oils, feeds, cocoa, and rice.

A pattern of regional activities was mapped out by FAO in a series of conferences convened in the past year in Europe, the Near East, the Far East, and Latin America. Temporary regional offices have been established in Rome and Cairo to serve Europe and the Near East, and definite plans for early establishment of offices in the Far East and Latin America have been formulated.

Eight Near East governments, represented at a meeting in Cairo in February, agreed on proposals for increasing production and raising living standards in the area. Irrigation development is the key need of the region.

Four meetings held at Baguio, the Philippines, in February and March dealt with problems of south and east Asia. The meetings were concerned with rice, nutrition, fisheries, and the FAO regional office for the area.

Delegates to the rice conference representing 19 countries agreed on a program for national and international action to overcome shortages. The conference drew up a draft constitution of an International Rice Council for cooperative action on production, conservation, distribution, and consumption of rice. The proposal to establish the Council is on the agenda of the fourth session of the FAO Conference, which is scheduled to meet in Washington in November 1948. Its ratification will require a two-thirds vote of the Conference.

Nutrition problems of the Far East were summarized by a committee of experts convened at Baguio prior to the rice meeting. A fisheries meeting, also held at Baguio, completed the framework for an Indo-Pacific Fisheries Council, one of a series of such regional bodies which FAO proposes eventually to set up to develop fisheries resources in order to provide food of high nutritive value urgently needed by the people of south and east Asia and other areas. The Indo-Pacific Fisheries Council will become active when five governments have ratified the draft agreement.

Two FAO conferences on special subjects were held in South America in the past year. A comprehensive program for the development of the timber resources of Latin America emerged from an International Timber Conference at Teresopolis, Brazil, and a conference on the nutrition problems of the region, held at Montevideo, Uruguay, agreed on recommendations to deal with important aspects of nutritional work in the area.

During the year FAO missions were organized for Siam and Venezuela at the request of the governments of those countries. FAO had previously sent missions to Greece (1946) and Poland (1947). The reports of the Polish, Siam, and Venezuela missions were published in 1948. The Siam mission included a survey of rice and forestry production and livestock management, with suggestions for their improvement. The Venezuela mission was limited to the single object of surveying the possibilities of increasing the production of vegetable oils in the country.

FAO's service of direct technical advice to governments has been greatly expanded in the past year. Specialists in agriculture, nutrition, forestry, and fisheries completed 35 assignments in Europe and supplied technical assistance on more than 50 projects in China.

One of the most important of those in China involves technical assistance by FAO to the Government in the development of a project to vaccinate 15,000,000 animals against rinderpest, one of the most destructive animal diseases of the Orient. A large part of the financing of such technical services during the past year was derived from funds transferred to FAO by the United Nations Relief and Rehabilitation Administration.

FAO schools and meetings for technical workers have been held on a variety of subjects in Europe, Asia, the Near East, and Latin America. Subjects treated include statistics—in preparation for the 1950 world census of agriculture, soil conservation, food preservation, infestation of stored grain, hybrid corn, artificial insemination, and veterinary serums and vaccines.

Integration of FAO's activities with those of the United Nations and other international agencies, to avoid duplication and to increase effectiveness through joint effort, has been a continuing policy of the Organization. During the past year, an FAO group working with the Economic Commission for Europe has analyzed the agricultural reconstruction and development program of 26 European countries through 1950–51. An ECE European Timber Committee staffed by FAO specialists gave technical aid to governments in carrying out the recommendations of the 1947 European Timber Conference. The program resulted in a 10-percent increase in European timber production. FAO is helping to staff the Joint Working Parties of the Economic Commission for Asia and the Far East and the Economic Commission for Latin America to determine the equipment and material needed in these regions for reconstruction and rehabilitation.

FAO officers have worked in coöperation with the United Nations International Children's Emergency Fund, and the Organization has maintained close relations with the World Health Organization and other specialized agencies of the United Nations.

Significant contributions have been made by FAO to the international literature of agriculture, nutrition, forestry, and fisheries. Publications of exceptional value issued in the past year have been a Yearbook of Food and Agricultural Statistics, a Yearbook of International Trade in Agricultural Commodities, a Yearbook of Forest Products Statistics, and a Yearbook of Fisheries Statistics.

Norris E. Dodd, the former Under Secretary of the United States Department of Agriculture, was named Director-General of the FAO at a special session of the Conference called in Washington in April 1948. Mr. Dodd succeeded Sir John Boyd Orr, of Scotland, who had served as Director-General since FAO was established at Quebec, Canada, in October 1945.

The Conference approved the appointment of Sir Herbert Broadley as Deputy Director-General to succeed Noble Clark, who served temporarily in the post during the first 6 months of 1948. Sir Herbert was formerly Deputy Secretary of the British Ministry of Food.

Acting upon the suggestion of the Council of FAO, the Director-General prepared for the approval of the Conference of FAO a program of priorities of work for the ensuing year. Under the proposed arrangement the Organization will be engaged on a limited number of most important projects which give promise of effective action.

This will prevent the spreading of FAO's resources too thinly over a huge field of less urgent proposals.

AGRICULTURAL COLLABORATION WITH FOREIGN COUNTRIES

Agricultural cooperation by the United States with foreign countries is expanding. Our technicians and those of cooperating American Republics have reported significant advances recently. Scientific projects and studies designed to increase the production and improve the quality of needed crops and to contribute otherwise to the improvement of agriculture and the economic betterment of the people of the Americas have gained in efficiency and momentum.

The field has been widened by Public Law 402, known as the United States Information and Educational Exchange Act of 1948. This act authorizes agricultural cooperation by the United States with countries anywhere. Previously the authorized collaboration was only in the Western Hemisphere, Liberia, and the Philippine Islands.

Agricultural stations in Bolivia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Nicaragua, and Peru are operated cooperatively by the governments of those countries and the United States Department of Agriculture. The Office of Foreign Agricultural Relations acts for the department at these stations, and elsewhere in the American countries. Work is under way to develop improved plant types and varieties, combat plant pests and diseases, and improve cultivating and processing techniques.

Such efforts to stimulate crop production in the American countries have been carried on cooperatively for a number of years. Among other objectives, the work aims to provide the United States with agricultural commodities not produced here, such as critical and strategic materials vital for defense purposes, for medical reasons, or for variations and improvements in the national dietary. Notable among the desired commodities are cinchona (the source of quinine and other medicinal drugs), rubber, kenaf and other fibers, cacao coffee, palm oil, pyrethrum, rotenone, bananas, and other tropical products.

Recent Specific Results

Research has resulted in the selection of several cinchona trees with desirable characteristics of growth, bark, and quinine yield. Subjected to critical tests these trees have been found to have a quinidine content of from 1.53 to 3.27 percent, as compared with a normal content in cinchona trees of none to 0.4 percent. Preliminary study of over 4,000 cinchona trees of various species and forms indicated that most of the plants were highly susceptible to the organisms that cause root rot and collar rot. But seedlings from six cinchona trees with desirable growth and alkaloid-producing characteristics, and seedlings from two trees desirable as root stocks, seemed to be resistant to these diseases. Progeny from these trees are being investigated further. An improved method of grafting saves considerable time and reduces losses.

Search for pyrethrum plants with desirable growth and productivity characteristics is in progress. The cooperative agricultural station in Guatemala studied and analyzed 186 selected plants, and found 5 whose flowers contained more than 1.3 percent total pyrethrins, compared with 0.9 to 1 percent in normal commercial pyrethrum flowers. Growth and productivity in some experimental plantings have been satisfactory. In most of the experimental areas in Ecuador pyrethrum has grown poorly, but desirable growth was made in three important areas. Of the many plants studied, flowers of several showed high pyrethrin content—up to 1.25 percent.

Rotenone research, concentrated chiefly in eastern Peru, has indicated that the rotenone content of roots from this area averages about 5 percent. Explorations on the eastern slope of the Andes have revealed plants with an average rotenone content of 10.25 percent. Propagating material from several promising areas has been assembled and is now under critical study, with the advantage of an improved method of processing the rotenone-bearing roots.

Cooperation in Fiber Research

Production at low cost of fiber suitable for many of the purposes for which jute from India has been used is the goal of a research program in which Peru, El Salvador, Cuba, and the United States are collaborating.

Many plants yield jutelike fibers. Kenaf, of commercial importance in Java, proved superior in several respects. Its early growth smothers weeds and eliminates weeding costs, and its yield of adequate quality fiber is high. Breeding experiments indicate an even greater yield may be obtained.

In India, fiber is removed from jute plants by a slow and disagreeable process of retting which requires much hand labor. Collaborative agricultural research in tropical America aims to get fiber production with little hand labor. It has been shown in El Salvador that with naturally warm water of 93° F. instead of cooler water, the retting can be completed in 42 hours, instead of from 96 to 120 hours. Research in Cuba looks toward full mechanization of kenaf production. The seed is planted and harvested and the fiber extracted, dried, and baled by mechanical means.

In El Salvador kenaf seed has been studied as a source of vegetable oil. It yields an oil suited for salad and cooking purposes, as well as for soap making and other industrial uses. The cake residue is an excellent food for dairy cows. The yield of oil is about 20 percent of the weight of the seed when extracted by solvents; 14 percent when extracted by pressure. A seed yield of 900 pounds per acre is considered reasonable.

Cacao and Coffee

Most of the world's cacao came formerly from the Western Hemisphere. Production shifted to other parts of the world because of diseases which attacked the cacao tree. Collaborative research by the United States, Peru, Ecuador, and Nicaragua seeks to develop disease-resistant cacao trees which will yield abundant, high-quality cacao. Progress has not been as rapid because the trees require about 7 years to reach good fruit production. However, nearly 300 mature cacao trees apparently superior in vigor, productivity and disease resistance have been selected in Ecuador, propagated, and planted for critical comparison with varieties from other countries.

Cacao plants are sensitive to light. Research has shown that the best plant development in the nursery occurs when full sunlight is reduced by about 35 percent. The Department has sponsored the establishment of the Inter-American Technical Cacao Committee for the exchange of information and skills.

International collaboration has shown that coffee seedlings produced from seed selected from the innermost nodes of the fruiting coffee plant germinate more completely and grow more vigorously in the nursery than seedlings from seed selected from the outermost portions of the branches. Another important finding is that coffee pulp can be used to feed dairy cattle. Coffee pulp, the sweetish material which encloses the coffee grain, is normally a waste product, the disposition of which has often been a problem. Experiments in El Salvador have shown that the dried pulp has a nutritive value for milk production about equal to corn, and that goats digest it readily. Feeding trials are under way to test its effect on swine and other animals. Studies of coffee diseases and coffee production practices have resulted in important findings.

Tropical soils vary enormously in crop-producing capacity. Studies to learn why involve soil mapping, fertility trials on important soil types, and physical and chemical analyses. One such study, based upon 3 years' work in Ecuador and one at Cornell University, has been completed. It has revealed some important facts, though criteria developed for soils in the Temperate Zones often cannot be applied to soils in the Tropics.

International Work for Pest Control

Advances have been made in combatting insect pests, such as locusts and mosquitoes. Cooperation in this activity has become of increasing importance. Technicians from this Department have helped to develop and operate international organizations for locust control in a number of South American countries, and also in Central America and Mexico. Organizations established for this purpose have achieved definite progress.

Research for means to control malarial and yellow fever mosquitoes in tropical American areas is under way at the cooperative agricultural station at Tingo Maria, Peru. An outbreak of malaria at the station in 1945 threatened to disrupt work there. The Office of Foreign Agricultural Relations sent an entomologist to cooperate with technicians of the Peruvian Government, with the Pan American Sanitary Bureau, and with the Servicio Cooperativo Inter-Americano de Salud Publica. A practical and effective system was organized to safeguard the health of the station personnel and others living in the area. Systematic use of DDT in dwellings, stables, and other resting places of mosquitoes was highly successful. Malaria at Tingo Maria has been reduced from about 30 percent in 1945–46 to practically zero.

OUR FARM PRODUCTION GOALS

Production goals which the Department issues annually are suggestions or recommendations to the farmers with regard to desired acreages of crops and numbers of livestock. In other words they are advisory rather than mandatory. Nevertheless, farmers use the goals in planning their individual crop and livestock operations. Based on realistic information about demand conditions and agricultural resources, both human and material, the goals enable farmers to work together for adequate, properly balanced production.

In 1948 the over-all objective was increased production, with restraint requested in only a few products, notably potatoes. Underlying the continuing high goals was recognition of the world need for food and this country's own high domestic consumption requirements. This was particularly evident in the goals for wheat, rice, dry beans, and feed grains. Aims for livestock and livestock products were high, in view of the reduced supply of feed grains and the keen demand for food grains.

The Goals Handbook explained that the national interest called for another year of all-out production with unavoidable continued drain on resources. The continued large acreages suggested for cultivated crops meant a further postponement in the return to a system of farming which puts less strain on the fertility of the soil. Farmers reporting through the State USDA councils indicated a recognition that the land is being pushed too hard and a desire to return to better rotations and more extensive soil conservation practices. In the years to come, farmers will have arrears of conservation work to do.

Suggested Objectives for 1949

Goals used for 1949 likewise rank production above conservation, though they ask for as much soil care as the conditions allow. Farmers respond eagerly to requests for increased production; the more difficult curtailment process, except in a few lines, is not yet necessary. Hence the response to the 1949 goals should be fully up to the wartime and postwar standard.

The suggested wheat-acreage goal for the 1949 harvest is 71.5 million acres. With average weather this should yield a total production of about 1.1—to be exact, 1.072—billion bushels of wheat. This is the same production as would have resulted with average yields from last year's goals of 75.1 million acres, and assumes an upward trend in yields. It should suffice for all our normal needs and outstanding commitments, both at home and abroad, and at the same time should reduce the pressure on overworked land in the Great Plains. Virtually all of the 8-percent (6 million acres) difference between the 1949 goals and the actual acreage in 1948 is due to lower goals in the Great Plains area.

Naturally, the way to get more production of crops desired in increased quantities is not always a direct way. The purpose of the recommended goals is to encourage balanced use of farm resources, with emphasis on the crops and kinds of livestock most needed and with as much attention meanwhile to conservation and future production as fulfillment of the current production requirements will allow.

The Livestock Goals

In general the livestock situation reflects the fact that livestock numbers began to outrun feed supplies in 1944. The problem since then has been feed plus high prices. Cattlemen have marketed more cattle than they have been raising, partly because ranges and pastures have been heavily stocked and in some cases overstocked, and partly because stockmen do not know how long the current price level will last. This Department has urged livestock men to keep livestock numbers as high as possible. The farmers have evidently tried to do so. For example, the 1948 spring and fall pig crops will not be much different from those of 1947 despite a big reduction in the 1947 corn crop. Poultry and dairy production have likewise held up well.

The beef goals for 1947 recommended reduced slaughter of beef cattle. This was to safeguard the future beef supply. Slaughter of cattle and calves in 1947 ran above the goal for that year and established an all-time record. This slaughter, plus death losses, exceeded the calf crop and resulted by the beginning of 1948 in a sharp decline in total cattle numbers for the third successive year. In asking for a total slaughter of 32 million cattle and calves in 1948, as compared with 36 million in 1947, the Department sought a middle course between two dangers—(1) that an extreme reduction in slaughter for the sake of halting the decline in cattle numbers would force meat prices even higher; and (2) that sustained or increased slaughter would endanger the country's future beef supply. It should be borne in mind that no controls of any kind exist to influence slaughter or cattle numbers.

The fall pig goal announced in the spring of 1948 asked producers to increase their production of fall pigs by at least 10 percent. This was a request for not less than 34.4 million fall pigs or 3 million more than the total produced in the fall of 1947. Through all the channels available to it, the Department emphasized and reemphasized the need for increased hog production. When the Congress decided to continue price support for hogs beyond the end of 1948, the Department issued a special appeal to the producers. It asked them to hold back bred sows and gilts from the market as a means of promoting the desired increase in the fall pig crop. Nevertheless, the number of hogs available for marketing will continue for some time to reflect the influence of the short corn crop produced in 1947 and the ensuing high corn prices. This influence in fact may be discernible until the end of 1949. Meantime, however, the large corn crop of 1948 will encourage hog producers to feed their hogs to exceptionally heavy weights.

The effect on total market supplies should be evident by the middle of the 1948–49 winter. Moreover, the requested increase in the 1948 fall pig crop, if it materializes satisfactorily, will add something to the pork supply next summer. Fortunately, the large corn crop and the lower corn prices now in prospect should result in a substantial increase in the 1949 spring pig crop.

Trend in Sheep and Lamb Production

Sheep and lamb numbers have been declining in recent years but throughout the period from 1944 to date the goal statements have recommended a halt in the downward trend of numbers, and the slaughter goals for sheep and lambs for each year were established with this objective in view. In each year to 1947, however, the slaughter realized has exceeded the goal by about 12 to 15 percent. That is, farmers and ranchers have consistently marketed more sheep and lambs than the Department recommended. The downward trend in sheep numbers throughout the war period was evidently due to the competitive advantage of other enterprises, the difficulty of obtaining competent herders, and rising costs in relation to returns. The Government Price Support Program for wool materially raised wool growers' incomes above those they would have otherwise received but has only slowed down the decline in the number of sheep and lambs, which has now been under way since 1942.

CAMPAIGN TO CONSERVE FOOD AND FEED

Poor crop weather and circumstances throughout the world made food a continuing world problem in late 1947. Drought and frosts had cut Europe's wheat production by more than 300 million bushels, and in the United States the corn crop had suffered from spring floods and midsummer droughts. The harvest, though above 2,800,000,000 bushels, was inadequate to maintain livestock production at the prevailing level. Simultaneously, domestic and foreign demands on our bumper wheat crop called for careful husbanding of this commodity.

The Cabinet Food Committee on September 24, 1947, urged the President to start a drive for domestic conservation of food and feed. The President appointed a citizens' food committee to advise on ways and means, and this committee adopted as its goal the conservation of 100 million extra bushels of grain to feed Europe's hungry. But the problem had another important aspect. The short corn crop and the great demand for grain and grain products had given new force to inflation, particularly in food prices.

Accordingly the President in November sent a message to the Congress calling for legislation to insure maximum use of food supplies and action to curb inflationary trends in foods and other basic items in the cost of living. The Congress did not give the powers requested, but it authorized the President in Public Law 395 to seek the desired ends through voluntary means. It made $1,000,000 available to carry out the program during the 6 months ended June 30, 1948. With this authority, the President directed the Secretary of Agriculture to consolidate this Department's food and feed conservation activities. To that end the Secretary established an Office for Food and Feed Conservation, which conducted an intensive campaign to conserve food and feed and at the same time to help stabilize prices. Waged on three fronts—farms, industries, and homes—the campaign achieved important results, largely through extra effort devoted to educational and other activities carried on normally by the Department.

Scientific and other agencies within the Department contributed knowledge and administrative experience. Among the cooperating agencies were the Bureau of Human Nutrition and Home Economics, the Bureau of Entomology and Plant Quarantine, the Bureau of Animal Industry, the Bureau of Dairy Industry, the Bureau of Plant Industry, Soils, and Agricultural Engineering, the Bureau of Agricultural Economics, the Soil Conservation Service, the Office of Information, the Production and Marketing Administration, and the Extension Service. An Advisory Committee representing about 50 national organizations helped the campaign.

Main Activities in Grain-Saving Effort

Among important farm activities were the protection of livestock, of growing crops, and of harvested grain. A farm rat-control campaign helped to save feed grains. It included wide distribution of technical information. On the average the annual loss of farm-stored grain is 5 percent. To reduce this loss the campaign asked farmers to clean their grain bins and to spray grain with DDT before storing it.

Several agencies pooled and increased their efforts to control and eradicate the European corn borer. Special funds provided additional scientific personnel in four widely infested States—Minnesota, Illinois, Iowa, and Wisconsin. The scientists advised farmers as to general methods and as to the proper timing of insecticide applications.

Other insect pests came under heavier attack, notably insects that attack the cotton plant and cause severe losses in the production of cottonseed oil, cottonseed meal, cottonseed hulls, and related food and feed products. There were special efforts against grasshoppers in the western plains and Mountain States; against food-destroying pests in home gardens and pantries; against livestock pests that cost the Nation nearly a billion dollars each year in reduced milk and meat production and damaged hides; against internal parasites of livestock; against grain-destroying fungi; and against weeds in small grains and corn.

Three-fourths of the Nation's grain never leaves the farm; it is used there mostly for livestock feed. Hence grain-feed practices are important in grain conservation. Accumulated research in the Bureau of Dairy Industry and the Bureau of Animal Industry, combined with findings of the State research and experiment stations, helped to conserve grain. Given to farmers in terms of balanced feeding rations, pasture-improvement practices, and the production of more and better roughage, technical information blended from diverse studies contributed significantly to the food-saving movement. The campaign emphasized the special timeliness of culling out poor and unprofitable livestock and poultry and keeping only vigorous and healthy herds and flocks. It also recommended better handling of livestock from farm to slaughtering plant so as to prevent loss of meat from bruises and other injuries. Similar projects aimed to reduce the loss of milk through poor handling practices and to reduce pig losses.

Participation of Consumer

The active support and participation of consumers was necessary, both to alleviate food shortages and to prevent or reduce inflation in food prices. Accordingly, the campaign for the conservation of food and feed assisted homemakers in meeting the day-to-day problems of food buying, meal planning, and preparation. It urged homemakers to:

1. Feed the family well nutritionally. Plan meals according to sound dietary practices and keep a food budget.
2. Use plentiful foods instead of scarce ones.
3. Use food alternates wisely. With purchase of some foods cut down, use nutritious replacements. At least once a week use meat alternates chosen from plentiful foods.
4. Serve dishes that extend scarce foods and save money.
5. Get money's worth from the food purchased.

With newspapers, radio stations, food industries, labor unions, consumer groups, and welfare organizations cooperating, these principles became practices in millions of homes. There was need for a publication giving low-cost recipes, meal plans, and buying suggestions geared to the food supply and price situation. The Office for Food and Feed Conservation and the Bureau of Human Nutrition and Home Economics developed a new-type recipe book, Money-Saving Main Dishes. Its 150 recipes and suggestions for variations showed ways of using inexpensive and plentiful foods in nutritious, easily prepared dishes. Within a month, 3,616,700 copies were allocated for distribution; altogether, 5,000,000 copies were printed. In addition, the Office for Food and Feed Conservation prepared and distributed a daily recipe service to newspapers and broadcasters.

Industry Activities for Grain Conservation

In industry the conservation of food and feed required several approaches. Among them were measures to eliminate waste at processing or distribution measures and efforts to reduce the nonessential and less essential use of grains. Food industries participated in measures to help consumers conserve food. Under the specific direction of Public Law 295 the Office of Food and Feed Conservation promoted the sale and use of foods in plentiful supply. This was a test or pilot program. It emphasized consumer information and promotion at the point of sale. York and Lancaster Counties, Pa., were the sites of the program chosen after consultation with national and regional leaders in the food distribution industry.

Notably, the program sought to attract consumer attention to plentiful foods through a symbol used in connection with the list of plentiful foods designated by the Department each month. This list had previously been a guide to the trade. Brought to consumer attention broadly for the first time, under the slogan "Buy Under the Banner," the symbol proved very effective. Nearly 1,500 retail food stores, serving about 500,000 consumers, entered into the test program in May and June. Merchants featured their own choices out of the 18 categories of plentiful foods; while consumers learned how to use these foods in preparing thrifty, nutritionally adequate meals.

This procedure substantially increased sales of plentiful foods and reduced pressure on the scarce, high-cost commodities. For example, sales of plentiful items such as canned peas, fresh citrus fruits, canned citrus juices, and fresh produce increased. Also, the test helped farmers to get a bigger market for many foods.

Another industry activity sponsored by the Office for Food and Feed Conservation endeavored to curtail insect and other damage to grain in transit. In addition, the Office for Food and Feed Conservation worked on plans for salvaging animal feeds from industrial waste, through arrangements to collect waste food products for processing. Another phase of the same approach encouraged more feed use of byproducts from distilled spirits, malt beverages, and related products.

Under Public Law 395, the Department sought voluntary agreements among grain-using industries whereby less grain would be lost to direct human consumption.

OUR FOOD CONSUMPTION

Food consumption in the United States, though slightly lower in 1948 than in 1947, was still about 12 percent per capita above the prewar level. The slight decline from 1947 chiefly reflected reduced output of livestock products. Exports of wheat were very large. Yet United States civilians consumed a larger proportion of the total available food supply than in any year since 1941. Only 8 percent of the food supply left the country for military uses, exports, and United States territories.

Total crop production in 1948 was a new record, but output of food crops was slightly smaller than in 1947. Substantial improvement occurred in feed crops, especially corn, with promise of increased production next year of livestock and livestock products. The better feed supply could not materially raise the 1948 livestock output, estimated in late July as likely to be 7 percent less than the 1947 and the smallest since 1942. The decrease reflected last year's feed-crop reduction.

As compared with that in 1947, per capita consumption increased in a few items, among them fresh and frozen fish, evaporated milk, margarine, and canned fruit and juices. These gains were more than offset by declines in meats, poultry, ice cream, butter, fresh fruits, fresh vegetables, sweetpotatoes, corn products, and sugar. Supplies of most livestock products were down, though still above prewar levels. Per capita consumption was below the prewar average in canned fish, sweetpotatoes, butter, and perhaps shortening and other edible fats and oils. Consumption of potatoes and of wheat products still was above prewar levels.

Retail food prices for 1948 averaged higher than in 1947, owing to high economic activity, strong consumer demand, and reduced production of meat and other livestock products. Smaller exports were a minor offsetting factor. Other chapters of this report give detail about prices, supplies, and exports.

NUTRITION

Studies of the food needs of our population—what nutrients and how much of each is needed for good nutrition and how the various foods contribute to these needs—have been going on in the Department of Agriculture since 1894, when the Congress first appropriated funds for research on food and nutrition. Since that time, the science of nutrition has developed greatly and produced much useful knowledge. Much more remains to be learned, however, before the food needs of human beings are adequately understood and the knowledge applied fully to the problem of production planning.

One branch of research in the Bureau of Human Nutrition and Home Economics deals with the distribution of the national food supply among different groups in the population. With funds made available by the Research and Marketing Administration, data have been obtained from a national urban-family sample taken during the spring of 1948. These facts will enable nutritionists to compare the current situation with that which existed in 1942, the latest previous date when such figures were secured. Comparable information is being obtained seasonally in four large cities in different regions of the country. The surveys will show what foods people in different income classes are buying and what they are spending for them. In brief, the data will help to define present and potential markets for agricultural products, as well as to reveal nutritional habits and shortcomings.

Families whose incomes have not kept pace with rising food costs may be in difficulties with their food budgets. The Bureau of Human Nutrition and Home Economics estimated that a low-cost food plan for a family of two adults and two children aged 10–12 and 7–9 might have cost from $18 to $20 a week at June 1948 city prices. Many families could not spend as much as that for food and many families who spent this much or more failed to invest their food dollars efficiently. Both groups could benefit from greater knowledge of food requirements and food values in relation to costs.

One way to determine nutritional requirements for various foods and nutrients is to study the nutrition of people in relation to their food intake. With funds made available through the RMA, the Bureau of Human Nutrition and Home Economics is engaged in several such studies, in cooperation with State agricultural experiment stations working together in regional groups.

Other research includes studies of human requirements for vitamin A when the sources are cod-liver oil or the provitamin carotenes as they occur in different foods. Results obtained thus far suggest that only one-fourth to one-third of the potential vitamin A value of two yellow-root vegetables, carrots and sweetpotatoes, is utilized by the body, as compared to one-third of that from a green, leafy vegetable, kale. Studies like these point to a whole field of investigation as yet hardly scratched—that of the human utilization of food nutrients from different sources.

Much of the Bureau's research on human requirements is done cooperatively with other agencies. For example, the food-energy requirements of children engaged in various activities are being studied jointly by Columbia University and the Bureau of Human Nutrition and Home Economics. Results will be an important contribution to our knowledge of children's food requirements.

Each year the Bureau of Human Nutrition and Home Economics estimates the nutritive value of the per capita food supply, as a contribution to a study of its adequacy. Figures for 1947 show slightly smaller supplies of most nutrients than were available in 1946, a peak year. Preliminary figures for 1948 indicate some further slight decline. Supplies of most nutrients will be well above the prewar average.

However, the estimated supply of calcium just about equals the suggested intake, based upon the recommended dietary allowances of the National Research Council (revised 1948). The amount of calcium in the food supply would be adequate to meet these levels only if the quantities were distributed according to need. Some families now use more than the average while many use less. This has important implications for dairymen. Milk is the most important single source of calcium and supplies three-fourths of the total. If families now consuming less than the average are to be able to obtain their quota, more milk must be produced.

Increasingly reliable data on nutritive values of foods are needed to improve the planning of diets, as well as for evaluating food consumption. Accurate new methods for the determination of certain amino acids are proving valuable. These methods have greatly facilitated studies of the amino acid content of foods and of the interrelationships of these nutrients in human and animal nutrition. Studies of protein values in grains are bringing useful results. Feeding experiments, for example, have shown that rolled oats is equal to or superior to other tested grains in both quality and quantity of protein. Rice protein has been shown to be equally good in quality though lower in quantity. Rye, whole wheat, barley, and corn follow in that order in the nutritional quality of their protein. This is knowledge of considerable practical importance. Many families, and indeed many nations, live on diets that contain relatively large quantities of grain products. With knowlege of relative protein values in grains they can often effect some improvement, narrow though their dietary choice may be.

We must also know more about how food values may be conserved; how commercial storage and processing affect them; and how they come through the kitchen. For instance, relatively large losses of some of the vitamins are due to their solubility in cooking water as well as to destructive temperatures. Ascorbic acid and thiamine are especially vulnerable to these losses. Experiments with potatoes show how cooking may influence the vitamin content of foods. Boiled whole or in their jackets, potatoes retain practically all their ascorbic acid and thiamine; when they are peeled before boiling, about three-quarters of the ascorbic acid remain. Mashed potatoes made from potatoes pared and quartered before cooking retained little more than half of their original ascorbic acid. Reheating involves additional loss of both ascorbic acid and thiamine. These and other studies dealing with vitamin losses have been reported in a technical bulletin and also published in guides for the preparation and use of foods in the home. Better food preparation may improve diets without additional money cost.

The research programs of the Bureau of Human Nutrition and Home Economics deal also with the selection and care of clothing and textiles and with housing and home equipment. The results reach consumers through popular leaflets, bulletins, and technical publications and also by the radio and the press.

INCOME, PRICES, AND PRICE LEGISLATION

Cash receipts from farm marketings continued at a high level throughout 1948 owing to sustained demand for American agricultural products both at home and abroad. The first half of the year showed a reduction in marketings of about 4 percent from the January–June period in 1947, with livestock and livestock products down slightly and crop marketings down moderately. Probably marketings of livestock will run below the 1947 level in the latter half of the year. On the other hand, crop marketings for these months may equal or exceed those of the corresponding months of 1947. Favorable crops indicated that.

The new drop in marketings below 1947 has been offset by a further rise of agricultural prices. In the first half of 1948 livestock prices were 11 percent and crop prices 4 percent higher than a year earlier; the average was 8 percent above that for 1947. The price average declined slightly in the July–December period.

Net income to the farmers will be somewhat less than that of 1947, the all-time high. Cash receipts from marketings may equal the 1947 total of 30 billion dollars. Gross income likewise may be about the same as that of the previous year. There will be a decline in Government payments to the farmers, which will aggregate some 280 million dollars, as compared with 314 million dollars in 1947. The effect of this reduction in the gross income, however, will have an offset in the form of an increase in the value of products used in farm homes. But agriculture's expenses of production will be larger. Allowance for the rise in costs suggests that the realized net income of farmers in 1948, or the sum remaining after they have paid production expenses, interest, and taxes, may be around 17 billion dollars as compared with 18 billion dollars last year, with a commodity or regional distribution somewhat different from that of 1947.

Farmers' expenses of production may be 5 percent or more above those for 1947. Items likely to show the greatest rise are hired labor, operation of motor vehicles, fertilizer, and maintenance and depreciation of buildings and equipment. Wage rates are higher; there are more motor vehicles on farms, and repairs, parts, and fuel are more expensive; increased costs for maintenance of buildings and equipment reflect advances in the quantity and quality of these facilities as well as the higher cost of replacement items. In fertilizer, consumed in 1948 in greater quantity and at slightly higher prices than in the previous year, the basis for the increased outlay is the high level of agricultural prices. Continued high prices for most farm products make increased use of artificial fertilizer profitable on many if not most farms. Payments by farmers for taxes and farm mortgage interest will be higher this year than in 1947. Taxes reflect rising costs of local government; mortgage interest reflects higher interest rates as well as the influence of rising farm-land values.

Aspects of Farm-Income Distribution

Some points in the income-distribution pattern deserve notice. Livestock on farms January 1, 1948, were fewer than a year previously and marketings of meat animals have been running lower than last year. Prices for livestock products have been enough higher, however, to indicate that receipts from meat animals during the calendar year 1948 would be about the same as in the previous year. Poultry and eggs will show some reduction in marketings, but prices will be up, especially for turkeys, and receipts may be a little higher. Slightly higher prices for eggs will offset the expected reduction in marketings; and the same applies to poultry, marketings of which will be significantly below those of 1947. Milk production is likewise below that of the previous year; fewer cows are producing slightly less milk. But dairy prices will average substantially higher than in 1947. Hence cash receipts to farmers from dairy products will be up.

Largely responsible for an expected reduction in crop receipts will be declines in receipts from tobacco, corn, and fruits. Production of nearly all types of tobacco will be down; moreover, a smaller part of the previous year's crop was marketed in 1948 than in 1947. Tobacco prices may average higher but not sufficiently so to prevent a drop in cash receipts. Corn production is up; yet the volume of corn sold during the calendar year 1948 will be smaller than in the previous year, as a result in part of the small 1947 corn production. Cash receipts from corn will undoubtedly decline from 1947. Receipts from fruits will also be down, largely because of lower prices.

In the first 6 months of 1948, during which period farmers' receipts from marketings totaled 12,751 million dollars, or about 6 percent more than in the corresponding period of 1947, gains were made in total receipts in all regions. Increases were also made in all regions in receipts from livestock but in the North Atlantic and East and West North Central regions receipts from crops were not quite equal to those of the previous year.

Total receipts from the marketings in the first half of 1948 rose 9 percent in the South Central region, 7 percent in the East North Central region, and 5 percent in the West North Central region. In the South Atlantic region the total increase over the corresponding 6 months of 1947 was 1 percent while in the Western region the gain was 4 percent. The North Atlantic region, with a 13-percent gain, scored the greatest advance. For the country as a whole, cash receipts from farmers' marketings in the period January–June compared with the corresponding months of 1947 were up 9 percent from livestock and 1 percent from crops—up 6 percent from livestock and crops together. For the full year 1948 receipts from crops may be slightly less than in 1947, while the receipts from livestock and products may be slightly larger.

Agricultural Prices

In early February 1948 sharp price declines occurred in food grains and in feed grains and to a lesser degree in most other groups, primarily in anticipation of prospects for improved food production abroad and of another year of heavy crop production in the United States. The over-all level of prices received by farmers declined 9 percent from January to February. By July, however, the general level of farm-product prices had recovered more than three-fourths of the February decline, owing largely to an advance in the prices of meat animals.

The second half of 1948 brought some adjustment to new crop conditions, notably in the prices of feed grains. Meat-animal prices should decline moderately with seasonal increase in marketings during the October–December quarter. Farm product prices for the July–December period may not average as high as in January–June, but the average for the year will be higher than in 1947.

Prices paid by farmers for commodities moved up during 1947 although not quite so rapidly as prices received by farmers. In January 1947 the index for these prices plus interest and taxes paid by farmers was 215. A year later the index was 251, a gain of 17 percent. The February break resulted in minor declines, but by June the index had recovered to the January level. For the second half of 1948, it is likely that the index will average about as high as in the first half. In general, the demand for industrial goods shows little indication of weakening and may be intensified as the national-defense program expands.

As a result of such movements in the indexes of prices received and paid by farmers, the parity ratio, which averaged 120 in 1947 and 117 in the first half of 1948, may be slightly lower in the last quarter of 1948. The average for 1948 may be 4 or 5 points below that for 1947.

New Price-Support Legislation

The Agricultural Act of 1948 extends price-support provisions similar to those now in effect to basic commodities marketed before June 30, 1950, and to Steagall commodities marketed before January 1, 1950. After these dates, it provides a new method of calculating parity prices for all commodities and a new schedule of support prices for the basic commodities. After January 1, 1950, price-support activities for Steagall commodities, except potatoes, are discretionary.

Under Title I of the act, prices received by cooperating producers of cotton, wheat, corn, tobacco, rice, and peanuts marketed before June 30, 1950, are to be supported at 90 percent of parity. Prices of Irish potatoes harvested before January 1, 1949, and prices of milk and its products, hogs, chickens and eggs marketed before January 1, 1950, are to be supported at 90 percent of the parity or comparable price. Prices of the other mandatory Steagall commodities are to be supported until January 1, 1950, at not less than 60 percent of the parity or comparable price nor at more than the level at which the commodity was supported in 1948. The price of wool is to be supported at the 1946 price-support level until June 30, 1950. The Secretary of Agriculture is given authority to require compliance with production goals and marketing regulations as a condition of eligibility of producers for price support.

Although most of the major commodities whose prices are being supported in 1948 will be supported at approximately the same level during 1949, it is possible (but not mandatory) under the act to make downward adjustments in support prices for some of the Steagall commodities—Irish potatoes, turkeys, dry beans and peas, soybeans for oil, flaxseed for oil, peanuts for oil, American Egyptian cotton, and sweetpotatoes—on or after January 1, 1949.

Title II of the act amends the parity-price formula, changes the definitions of carry-over, normal supply, and total supply for basic commodities which had been contained in the Agricultural Adjustment Act of 1938, and provides a new set of support-price schedules and conditions for the period beginning January 1, 1950. It also gives the Secretary of Agriculture general authority to support prices of agricultural commodities to producers through loans, purchases, payments, and other operations.

Method for Determining Parity

The parity price for any agricultural commodity is to be determined by dividing the average price received by farmers for that commodity during the preceding ten calendar years (or during the ten marketing seasons beginning within this period) by the index of prices received by farmers for all commodities during the same period to obtain an "adjusted base price." This adjusted base price is then multiplied by the current index of prices paid, interest, and taxes to obtain the current parity price. The effect of this formula in general is to reduce parity prices for some of the major crops and to increase those for most livestock products. The average level of parity prices for all commodities is unchanged.

A set of price-support schedules for the basic commodities is based upon new definitions of normal supply and total supply. The normal supply of corn, cotton, rice, wheat, and peanuts for any marketing year is defined as the estimated domestic consumption of the commodity during the preceding marketing year, plus the estimated exports of the commodity for the marketing year for which normal supply is being determined, plus an allowance for carry-over. Total supply for these commodities is defined as the carry-over of the commodity at the beginning of the marketing year, plus estimated production and imports.

When the total supply equals the normal supply, the minimum support price is set at 75 percent of parity. For each increase of 2 points in the supply percentage (total supply as percent of normal), the minimum price support is reduced by 1 point, reaching a low of 60 percent of parity when the supply percentage is greater than 130.

Similarly, the minimum support price is increased 1 point for each 2 point decrease in the supply percentage below 100, reaching a top of 90 percent of parity when the supply percentage is less than 70. Whenever acreage allotments or marketing quotas are in effect the minimum support price provided in this schedule is automatically increased by 20 percent, except that the support shall not exceed 90 percent of parity.

Marketing quotas for corn, wheat, cotton, and rice may be proclaimed when it is estimated that the total supply for the marketing year in question will exceed the normal supply by more than 20 percent (8 percent in the case of cotton) or when the average farm price for three successive months of the preceding marketing year has been 66 percent of parity or less, provided the supply is not less than a normal supply. Prior legislation which is not changed by this act provides that marketing quotas be proclaimed for peanuts each year.

Tobacco is to be supported at 90 percent of parity for any year in which marketing quotas are in effect. The Secretary of Agriculture is directed to proclaim a national marketing quota for each marketing year for each kind of tobacco for which a national marketing quota was proclaimed for the immediately preceding marketing year. For all practical purposes, this means price supports continuously at 90 percent of parity for the major types of tobacco except where a marketing quota may be opposed by more than one-third of the farmers voting in a referendum.

The Secretary is authorized to support prices of nonbasic commodities after January 1, 1950, at any level up to 90 percent of parity, taking into consideration the ability and willingness of producers to keep supply in line with demand and other factors. However, the Secretary is directed to support the price of wool at such a level not less than 60 percent nor more than 90 percent of parity as he may consider necessary to encourage an annual production of 360 million pounds of shorn wool, and to support the price of Irish potatoes harvested after December 31, 1949, at not less than 60 percent nor more than 90 percent of parity.

Transition to Longer Run

There are certain other provisions which will not be detailed here. In general, the act reflects a transition from the high support-price levels of the war period, which were designed to stimulate maximum production, to a longer run situation in which the main purpose of price-support activity will be to prevent farm prices from falling unduly low while at the same time permitting desirable adjustments in production. The Secretary is given authority to support prices of agricultural commodities at up to 90 percent of parity and even to go above 90 percent of parity if he finds such levels necessary to increase or maintain production in the interest of national security. However, the act quite clearly implies that the usual level of price supports in 1950 and after will be lower than at present. For example, the minimum price support schedule for basic commodities centers at 75 percent of the new parity under conditions of normal supply.

Prices received by farmers can be expected to average considerably higher than 75 percent of parity for most commodities if we maintain high levels of employment and national income. Under such circumstances price-support activities might be important for some individual commodities but would not have a great deal of effect upon the general farm-price level. However, if we should experience a sharp recession or depression, the price supports provided by the Agricultural Act of 1948 would be important in the maintenance of farm prices and incomes.

Support Prices in 1948

Support prices in use now as during the war years aid farmers in increasing or maintaining their production. By encouraging high-level food production, the support-price program in use since 1941 has helped to hold food prices at a reasonable level.

That the price supports have currently only a small influence on food prices appears in the fact that the chief inflationary pressure occurs in products that are well above support-price levels. This is conspicuously true of livestock products. Moreover, beef cattle and lambs are not included in the support-price program. On the other hand, commodities at or close to the support level, such as wheat, corn, and cotton, have been declining lately. In short, the support-price system is working currently for commodities that are declining rather than for commodities that are rising in price. Products for which supports are not operative have increased most in price.

Chiefly responsible for the rise of food prices is the fact that per capita incomes of consumers average two and one-half times the prewar level. Consequently, consumers demand increased quantities of the more expensive foods such as meat, poultry products, milk, and cream. Consumption of these products ranges from 15 to 27 percent above the prewar level. Consumption of the cheaper foods on the other hand is below the prewar level. For example, the consumption of potatoes, sugar, and wheat runs from 93 to 95 percent of the prewar average. Support prices, with the assurance they give to farmers that the bottom cannot fall suddenly out of the farm price structure, serve to maintain the confidence of producers and consequently to keep up the total volume of production. They are thus a moderating influence on the price level.

Agricultural prices and food costs have risen greatly since 1946. Nevertheless, farmers are still receiving only about the same share out of each dollar spent by consumers at retail as the 53 cents farmers were receiving in June 1946, the last month of general price control under the Office of Price Administration. The increase in food-marketing charges accounts for about as much of the rise since 1946 in retail food prices as does the increase that has taken place in the same period in the prices paid to farmers. Prices paid by farmers have also risen, and one of the chief reasons why support prices are as high as they are is the fact that support prices are tied to prices paid by farmers for the goods they themselves purchase—in short prices and costs generally are up, farm prices included.

Support-price operations cost money sometimes but so far the expense to the Government has been modest. In the fiscal year ended June 30, 1948, for example, net costs of the support-price operations of the Commodity Credit Corporation amounted to about 125 million dollars, while all operations of the CCC from 1933 through June 30, 1948, actually showed a net gain of almost 80 million dollars. Meanwhile, the estimated cash receipts of the farmers were more than 30 billion dollars in 1948. Even if we consider all of the 74 million dollars of Section 32 funds used for surplus removal and diversion of commodities during the last fiscal year along with the CCC price-support costs, it is clear that these relatively small sums were not keeping farm incomes high. The vast disparity indicates the overwhelming influence of high consumer incomes here at home and a strong foreign market.

Support prices can benefit the Nation as well as the farmer and the Department believes that the support-price program should be continued. This does not exclude the necessity to review and revise the program from time to time so as to keep it abreast of changing conditions and make it not only as useful but also as inexpensive as possible, in view of the goals toward which it should be set.

OPERATIONS OF THE COMMODITY CREDIT CORPORATION

The Commodiy Credit Corporation carried on two major activities during the fiscal year 1948—loans and purchases for price support and the procurement of large quantities of agricultural products, principally for use in foreign relief and rehabilitation programs.

The domestic and foreign demand for most commodities was exceptionally strong during the year and price-support operations on a substantial scale were necessary for only a relatively few commodities. These included potatoes, eggs, peanuts, sugar, dried fruits, tobacco, and wool.

As measured by the yardstick of purchases and new loans made, the scope of price-support operations during the fiscal year 1948 contracted somewhat from that of the previous 12-month period. Purchases and new loans made in the fiscal year 1948 totaled $633,082,614, as compared with $745,044,520 in the fiscal year 1947. However, the net loss sustained by the Corporation on price-support operations during the fiscal year 1948 was $125,382,594, as contrasted with a net loss of $42,784,596 during the fiscal year 1947. Price-support operations required by law involved rather heavy losses on potatoes and some losses on several other commodities, including eggs, wool, dried fruits, and sugar.

Exports of food from the United States during the fiscal year 1948 reached the record high total of 19,347,000 long tons, as compared with 19,160,000 long tons during the fiscal year 1947, and the prewar (1935–39) average of only 4,223,000 long tons.

More than 60 percent of the total food exports were procured by the Commodity Credit Corporation. These were obtained specifically for export programs or were acquired under price-support operations.

In addition, the Corporation procured several nonfood commodities, such as cotton and seeds. All commodities purchased under the Corporation's supply program—both food and nonfood—had a value of $1,291,253,735, as compared with a value of $1,094,161,208 during the fiscal year 1947.

Despite record food exports during the year, civilian per capita food consumption was 14 percent above the prewar average. As compared with average prewar consumption of specific commodities, United States civilians consumed during the fiscal year 1948 more of each type of food, except wheat products, rice, butter, fats and oils, potatoes, sweetpotatoes, sugar, dry edible peas, and dry edible beans.

Procurement by the Commodity Credit Corporation of agricultural commodities for export has meant the most efficient use of transportation and storage facilities—an extremely important consideration when large quantities are involved. For example, the Corporation has exported large quantities of grain from ports on the Gulf of Mexico, which are relatively nearer to the large grain-producing areas of the Nation than ports on the Atlantic or Pacific coasts. This has made possible a maximum use of boxcars, which are in short supply. Inland waterways also have been used to transport agricultural commodities scheduled for export, which has likewise eased the burden on rail facilities.

Record exports of grain have called for precise scheduling of ships to avoid clogging of port facilities. By controlling the flow of grain to seaports and by maintaining close liaison with claimants, the Corporation has been able to keep the export pipe line filled with a minimum of difficulty.

AGRICULTURE'S BALANCE SHEET

The assets of agriculture viewed as a single industry increased during 1947 from 110 to 122 billion dollars. Farm real estate increased in valuation from 59 to 63 billion dollars; other physical assets from 31 to 37 billion dollars. As in other recent years these changes were caused mostly by higher prices. Physical changes in inventory were generally small—farm machinery and motor vehicles a little higher, livestock numbers somewhat lower, real estate virtually unchanged. Liquid financial assets which include currency, bank deposits and United States savings bonds rose about three-fourths billion, to 20 billion dollars. The aggregate valuations of the assets of agriculture increased at the rate of 11 percent in 1947 compared with 13 percent in 1946. The rate of increase was markedly lower in 1947 for real estate, livestock, bank deposits, and currency. The rate of increase was notably higher for machinery and motor vehicles, crops, and household equipment.

For the second consecutive year farm-mortgage debt increased about 100 million dollars, apparently because of a falling-off of principal repayments. This occurred notwithstanding an increase in net farm income to the highest level in history. Apparently less income went to the repayment of debt because more was spent on equipment, improvements, and family living. This explanation squares with developments in non-real-estate short-term debt, where an increase of about 700 million dollars reflected the greater availability, at higher prices, of equipment, materials, and supplies used on the farm and in the farm home. With total indebtedness standing at 9 billion dollars, the proprietary equities of farmers and landlords on January 1, 1948, were 113 billion dollars, an increase of 11 billion for the year.

The 1947 increases in the assets of agriculture and in proprietary equities represent a continuation of changes that have taken place since 1940, but the increase in debts followed a trend newly established in 1946. Since 1940, farm assets have increased 68 billion dollars, while the net decrease in debt has been 1 billion dollars. Thus the equities of farm operators and landlords have increased 69 billion dollars during the war and postwar years.

As this increase in the equities of farmers and landlords rests in part on what may be a temporary price increase it is instructive to consider the result obtained by reducing the physical assets to valuations based on 1940 prices. So adjusted, the increase in the proprietary equities becomes 20 billion dollars. The components of the adjusted increase are: (1) Increase in financial assets, 17 billion dollars; (2) increase in physical inventories, 2 billion dollars; (3) decrease in debt, 1 billion dollars.

Such an adjustment of the valuations of the physical assets to 1940 prices serves to emphasize the primary importance of the growth of the farmers' financial assets during this period. The high valuations of the physical assets are less important not only because of the insecure foundation of inflated prices on which they rest, but also because they mean little to farmers who will continue to farm, and who, therefore, are not likely to liquidate more than a small proportion of their physical assets at current prices.

The chief gains, therefore, which the main body of farmers have realized during the war and postwar years are the higher incomes already reported and the consequent increase in holdings of financial assets and reduction of debts.

Increase in "Real Income"

The increase in "real income" has been notable. Despite higher prices and Federal income taxes, net income of farm operators, after taxes, would buy 1.7 times as much "family maintenance" in 1947 as in 1940. In 1946 and in most of the war years the buying power of farm income was even better. Here is the basic explanation of the farmer's improved position—of his ability to live better, to accumulate currency and bank deposits, to buy savings bonds, and to reduce debt.

The ability of farmers to accumulate financial assets has been such that their holdings of currency, deposits, and Government bonds would buy about two and one-half times as much at the beginning of 1948 as in 1940 in spite of the advance in prices. The reduction in debt has lowered fixed charges—a development that will take on increasing importance if farm prices and income decline.

Appraisal of the favorable financial status of agriculture in 1948 should take account of the fact that the fortunes of farmers are particularly sensitive to changes in prices and when the crest of this inflation passes, farm prices can be expected to decline sooner and more rapidly than industrial prices. The history of prices and of farming in war and postwar periods surely warns of this. The successive improvements in the financial condition of farmers which have been reported here for a number of years are developments which have occurred in the inflationary phase of a period dominated by World War II. In the period following World War I the relationship of prices received by farmers to prices paid remained unfavorable to farmers for two decades.

In that postwar deflation the index of farm prices fell from 237 (1913=100) for June 1920 to 114 a year later, whereas the index of a typical group of industrial prices (those of metals and metal products) fell from 200 to 133. This difference in the rate and extent of decline in prices of farm and industrial products contributed much to the economic difficulties of the period both on and off the farm.

CHANGES IN UNITED STATES FARMING

Changes in United States agriculture are exceptionally numerous and rapid at present as a result partly of recent developments in agricultural science and technology and partly of economic forces unleashed by the war and its aftermath. Knowledge of these changes may help to guide farm policy making.

In the uses of agricultural land the farmers in some areas have made important shifts since 1935–39, yet the country's total crop acreage has increased very little. Total farm production has increased greatly, in both crops and livestock products. And this has come about despite a 7-point decrease in the index of total farm employment and with 13 percent fewer hired workers. Gross farm production per worker was 31 points higher in 1947 than in 1935–39. In other words the farmers have discovered how to make a virtually constant crop acreage and less labor produce considerably more than formerly in food and other products directly for human consumption and in feed for livestock.

They have not avoided soil damage from heavy cropping. Each additional year of heavy cropping adds to the dangers of soil depletion and soil erosion and points to a time, possibly not far off, when further gains in production may involve some net loss to agriculture from a long-run standpoint. Like other businesses, agriculture cannot afford to draw upon its capital for any length of time.

For example, the farmers of the Great Plains broke 1,300,000 acres of grassland for their 1947 wheat crop—more than in any of the preceding 11 years. Since 1946 Great Plains farmers have plowed up and planted wheat on close to 3,000,000 acres of grassland. In the meantime, summer-fallowed land and land farmed on the contour have declined in this area. Such practices involve a heavy drain on the soil, with risk of bad soil blowing in drought years.

Significant of the toll we are levying on our soil is the fact that the crop goals officially suggested for intertilled crops for 1948 amount to nearly 156,000,000 acres, about 9,000,000 acres above the corresponding total in 1947. This use of land for intertilled crops equals the full intensity of the war years. Moreover, the continued great needs for wheat and feed grains oblige the farmers to grow close-growing crops on an acreage about as large as that of last year.

One evidence of the lag in conservation is the suggested acreage in tame hay, which for 1948 is below the 1942–46 average. World food needs have continued priority over increases in tame hay acreage.

Main Technical Changes

The principal changes in American agriculture in recent years come under six main headings: (1) Shifts from animal to tractor power; (2) increased use of fertilizer and lime; (3) the development and use of better seed varieties; (4) increased use, as the pressure of world demands permits, of cover crops and other conservation practices; (5) better pest and disease control; (6) better feeding of livestock.

In all these means of technological advancement American agriculture entered the war period with a strong foundation already laid. Scientific and technical progress in the war years subsequently strengthened this foundation and built the superstructure up higher. Farmers expect to keep on with their mechanization, seed improvements, increased fertilization, and better farming practices in general. As soon as possible they will reduce the acreage in intertilled crops. Eventually this acreage reduction will mean increased rather than decreased production of agricultural commodities for human use, because it will safeguard and build up soil resources.

Great importance attaches to a gradual shift during the last 25 years from grass hay to legume hay. This change with only a moderate accompanying rise in the hay acreage has added more than 40 percent to the amount of total digestible proteins fed to farm animals in hay. This is an extremely important element in the above-mentioned better feeding of livestock.

Shifts from animal to machine power gave the biggest contribution to the increase of farm production for human use. Cropland and pasture land released in this way since 1918 provided the acreage required in 1947 to feed about 19,000,000 head of cattle and calves. Fertilizer and lime have also exerted a tremendous influence. The use of commercial fertilizer has more than doubled since 1935–39 and that of lime has tripled or more. Furthermore significant quantities are being used in new areas and on new crops. Considerable amounts of fertilizer are finding their way onto Corn Belt farms these days, having demonstrated that they can pay their way even on some of the Nation's best soils. Not all the fertilizer is being applied to the primary cash crop. Farmers are finding that additional quantities of high-quality hay or pasture when converted into meat or milk are also effective in increasing farm incomes. Such practices, once established, will not be easily dropped. As to better seed varieties, the best-known example is hybrid corn, which has raised the yields of corn in the Corn Belt by some 20 percent. Improved varieties of wheat, oats, and soybeans have been extremely important in the production gains of the last few years.

Adjustments for Years Ahead

In order to maintain the advantage of their improved technology, farmers will have to make some big adjustments eventually. For example, Corn Belt farmers have excessively increased their acreage of the intertilled crops—chiefly corn and soybeans. Since 1940 they have diverted more than 10,000,000 acres of land from grass into corn, soybeans, and other intertilled crops. As a result, the balance among corn, soybeans, hay and pasture in the Corn Belt is not what it should be. To protect the soil, these farmers will have to put considerable acreage back into grass.

Wheat farmers have increased their acreage and production almost to the limit. They have added nearly 5,000,000 more acres of wheat in the Great Plains area since 1944. Moreover, the Great Plains farmers, as already mentioned, have already plowed up considerable acreage that is risky for crops. Although our need for wheat may well remain above prewar levels, adjustments will be needed to assure stability under conditions of less favorable prices, costs, and weather.

In the South, agriculture depends less on cotton than it did before the war, but its cotton problem is still outstanding. Cotton's currently favorable position could quickly change. With the demand for cotton as strong as it is now, southern farmers will probably not feel inclined to reduce their cotton acreages.

There is need for the shift that has been taking place to other farm enterprises, such as livestock production, that may provide alternative sources of income and a better living.

In the far West farmers and ranchers are readjusting their production and marketing programs to take care of a rapidly expanding population along the west coast. Products that formerly found their way to the eastern consumer after long and expensive journeys by rail or water are now finding markets much closer at hand. This trend is not likely to be reversed as industrialization expands in the West.

Similarly northeastern farmers have found it necessary to adjust to their industrial environment. The consumer is close by and provides good markets for the bulky and perishable products that dominate the farming of the region, but the competition of industry and agriculture for labor frequently works to the farmer's disadvantage. The active demand for home sites for full-time industrial workers and for part-time farmers and the operation of farms by those who depend almost entirely on other sources of income introduce competition for land.

LONG-TIME FARM ADJUSTMENT

The report last year emphasized production and deferred consideration of what to do when the world food crisis ends. The demand for American food was then extremely urgent. With few exceptions our farm commodities seemed likely to be scarce indefinitely. Pressure on the American food supply has again been strong in 1948. Our farmers have answered with high production, yet without overtaking the requirements. Moreover, the European Recovery Program indicates that heavy export will continue for a while and also that domestic consumption will remain high. Ostensibly the agricultural developments resemble those of 1947 and appear to exclude anxiety about surpluses and low prices for most farm products. Each year, however, brings normal conditions nearer—conditions of lessened world dependency on American farm products.

Our response to the food crisis helps the world to help itself. That is the purpose. But as we help to solve the world's problem we create a problem for ourselves. If Europe is living on borrowed production, United States agriculture is living on borrowed time. What it does with the loan may determine its fate for years. It has currently a respite from postwar readjustment, borrowed by the Nation's program for world healing. Eventually the respite will be over and our farmers will depend on the buying power of individual consumers at home and abroad. Adjustment to the change will not be easy. I think the time has come to ponder what it may involve.

Essentially, agriculture's problem is the problem of finding scope for expanding power to produce. Agriculture forges ahead in production by increased use of machinery, improved plants and animals, means for controlling agricultural pests and diseases, fertilizer materials, and many other facilities. The forces of science and education and the enlightened self-interest of farmers in adopting new techniques invest this process with tremendous momentum. Productive effort may be shifted from one commodity to others, but we could scarcely control the upward thrust of total farm production, even if we wanted to do so.

A large share of agriculture's present productive capacity results from recent technical progress. Much of it was a response to insatiable wartime demands for food and fiber and to the world food crisis which has followed the war. It is not pessimism but prudence to remember the unusual and temporary character of a part of our present export market. At the same time, many people believe that the domestic demand for farm products is abnormally high at present and must sooner or later recede. Certainly there is need for a sober appraisal of the factors which will determine the balance between farm production and outlets for farm products after the immediate food crisis is over.

Current Conditions Highly Favorable

Agricultural conditions in the United States are extremely favorable just now. Farm income in 1948 may approximate the high it reached the previous year. Prices for agricultural commodities in 1947 averaged 260 percent of the prewar (1935–39) level and were 18 percent above the peak reached after World War I. Prices received by farmers since 1943 have averaged 115 to 120 percent of the prices they have paid. Between the wars, except in 1919 and 1920, the ratio of prices received to prices paid by farmers was continuously below 100 percent—in the depths of the depression as much as 50 percent below. Chiefly responsible for the rise in farm prices is the growth of individual consumer incomes in the United States. Per capita incomes less personal taxes in 1947 averaged 240 percent of prewar (1935–39) incomes. With the population about 12 percent greater, the total disposable income of all consumers averaged 265 percent of prewar.

If a stable peace is established, the world food situation will improve year by year and the abnormal demand for grain exports from the United States will slacken. The current backlog of demand for automobiles, farm machinery, and many types of industrial equipment and construction in this country will gradually be worked off, as will similar demands for United States industrial goods in foreign countries. As these things occur, many readjustments may take place in both farm and nonfarm prices.

This does not necessarily mean a sharp or prolonged recession. There are many factors which indicate a less sharp readjustment for agriculture than that which followed World War I. The European Recovery Program will call for substantial exports of United States farm products during the next 4 years. It is probable that a fairly broad program of price supports will be continued even after the present emergency legislation expires. Consequently, adjustments in farm prices may very well come as a series of steps instead of in a sudden breath-taking plunge like that of 1920–21.

Moreover, farmers are in a better position now to absorb any shocks that may develop. Significantly, they have relatively low debts and ample liquid assets such as cash and bonds. Stocks of our staple agricultural commodities are relatively low, and there is no evident danger that farmers will be forced into heavy liquidation of livestock. Also, good farming practices make some reduction of grain acreage desirable when the world food crisis is over. In short, both the world situation and the domestic outlook promise comparative freedom at least from some of the problems that came after World War I.

For the long pull, if we get a stable peace, our agricultural economy should thrive along with the Nation's economy as a whole. We have called attention to the forces that tend to expand farm production. There are also strong forces making for growth in the rest of the economy, and in the demand for farm products. The most important will be the continuing growth of our population. There will also be a continued steady increase in productivity per worker, such as has characterized our economy for decades. Among the results will be increased incomes per person and increased per capita consumption of farm products.

Trends Affecting Agriculture

From 1940 to 1948 our population increased 13 millions, or fully 10 percent. Authorities believe our population by 1975 will be somewhere between 162 and 185 millions as compared with 144 millions on July 1, 1947. The higher figure is an outside estimate, hardly likely to be attained. Much depends on business activity and employment. People are more likely in good times than in bad to feel they can afford to have children. Moreover, immigration is likely to be greater in active than in slack times. Given reasonably good economic conditions, it seems likely that our population will increase by about a million persons a year, and may reach a level in 1975 about midway between the two figures shown above—20 percent higher than at present. It is not likely that our population will be less than 162 millions by 1975 even if we have some intermediate or occasional low-level employment.

Other basic long-time factors in farm and nonfarm prosperity are the Nation's labor force, the production per worker, and the total national output. Our labor force will increase in about the same proportion as the population. Specifically, it should be larger in 1975 than it is now by some 10 to 12 million persons, or by some 15 to 20 percent. As to production per worker, we have some basis for a forecast in the fact that since 1910 production per man-hour has increased by slightly more than 2 percent each year; on the other hand, hours worked per week have decreased. Hence the annual output of the average employed worker in the last three or four decades has increased at a slightly lower rate than 2 percent per year.

Continued increases in production per worker at a rate of say 1.5 percent per year would raise the annual output per worker by 1960 to 20 percent higher than the present level. Continuance of this rate of increase up to 1975 would result by that year in 50 percent more production per worker than the country is getting now. But the past does not tell us surely what the future will be.

With lower business activity, output per worker would not increase so fast. Under such conditions technological advances would be slower and the workweek shorter.

Even some unemployment, however, would probably not prevent an increase of at least 30 percent in the annual output per worker by 1975. In combination the prospective growth in the labor force and in the individual worker's productivity could raise the total output of nonfarm goods and services by 1975 to a point 60 to 75 percent above the present level. With agricultural production increasing too, the

Nation's real income per capita would be 40 to 50 percent higher than it is now.

Demand Prospects at Home and Abroad

The growth of population and purchasing power largely determines the domestic market, which absorbs some 90 percent of our farm production. It is probable that in the years ahead demand here will absorb increasing quantities of food at prices relatively favorable to the farmers. Certainly that will be true if we continue to have high employment.

In 1947 the average consumer ate about 16 percent more food than he did in prewar years. This improvement was the combined result of production gains and of increases in consumer incomes, particularly among the lower-income groups. Possibly the relative scarcity of other goods, such as automobiles and new houses, was a contributing factor. It is probable that the consumption of food per capita will increase further if the economic situation remains good, perhaps to about 20 percent above the 1935–39 level by 1960 and to 25 percent above by 1975.

Even rather unfavorable economic conditions would probably not cause substantial declines in per capita consumption below present levels, though such conditions would cut down the farmers' reward. Continuance of high-level employment would confirm trends in the selection of foods, as well as the upward trend in the per capita average. Fruits and vegetables, dairy products, and meats would benefit.

Growth of population will strengthen the outlook for our major nonfood products—tobacco, cotton, and wool. Per capita consumption of tobacco is not likely to recede much from the high 1947 level even under moderately depressed conditions. With sustained prosperity it may increase somewhat further. Under conditions of high employment total domestic consumption of cotton and wool a decade or two hence may be equal to the high 1947 rates. Per capita consumption will probably average less than in 1947 but well above the prewar level.

Agriculture's prospects depend, however, on the foreign as well as on the domestic market. High employment in the United States is not enough. Without foreign markets, agriculture could run into trouble. It is a heavy producer of certain commodities for export—notably cotton, tobacco, wheat, rice, and some fruits. Need to restrict production in these lines might disturb the whole farm economy, through the shifts it would involve to production for domestic use. Moreover, export trade may meet obstacles, such as retained or revived trade barriers.

We have some protection against this danger. Agreements negotiated recently at Geneva, whereby members of the International Trade Organization reciprocally reduce their tariffs and other trade restrictions, are an important safeguard. But progress toward freer trade is slow. Many countries must protect their trade balances; moreover, few nations currently have much to sell. However, the outlook is for continued growth in world population, and importing countries will have to depend largely on existing sources of agricultural foodstuffs and raw materials. Great new producing areas will probably not be opened up within the next decade or two. Briefly, the chance for American farm export trade is good, provided the present world attitude toward reciprocal trade continues.

Agriculture's ERP Role

The European Recovery Program will require large agricultural exports during the next 4 years. Estimates submitted to Congress call for exports of 250 million or more bushels of wheat and about 100 million bushels of coarse grain annually through 1951–52. Tobacco exports may exceed prewar quantities. Exports of cotton may fall below the prewar average but should exceed 3.5 million bales annually. The exact quantities to be moved will be worked out on a year-to-year basis. A large part of these exports will be made on a gift or loan basis and may temporarily absorb all the production we can spare. We are not likely to run into serious surpluses of our major export commodities soon. At the same time we should not forget that the conditions of international trade over the long pull will be quite different from those in the present period of emergency.

The European Recovery Program will contribute to the soundness of our long-run trade position. Heretofore Europe has been our principal foreign market. It is evident that Europe's ability to buy our agricultural products in the future will depend largely on three things: (1) On its buying power, which in turn will reflect its export power, particularly in nonfarm goods; (2) on the extent to which western Europe can get food and agricultural materials elsewhere than in the United States; and (3) on the willingness of the United States to accept what Europe is in a position to offer as payment for American food and fiber. Obviously we can do more about the third of these factors than about the other two.

Long-Time Farm Export Trade

It is a truism that in order to do a large export trade permanently we must do a large import trade as well. We can export larger quantities of some farm products only if we import larger quantities of other farm commodities and of mineral and industrial products. We might do an increased farm export trade temporarily on the basis of increased foreign lending; but that procedure would merely postpone the need to take imports in a larger volume. Ultimately we have to take goods and services for what we send away; otherwise the exports become gifts or losses. With high trade barriers to imports we could make our world trade so one-sided that it would not thrive.

In another period of severely restricted international trade, the physical volume of our exports might drop to a lower level than that of the 1930's. This would be bad from every standpoint. In the first place, the world needs our grain, tobacco, cotton, and fruits; secondly, we need the market for these things which the world can provide; thirdly, with the natural interchange blocked, the risk of war will increase. When the world food crisis ends, our agricultural exports may decline to some extent. To maintain them at a desirable level will require vigorous action through the International Trade

Organization, whose charter recently received preliminary approval by 53 nations.

Our exports of nonagricultural goods and services will probably continue at a high level for several years. Exports of such items, dollar for dollar, result in less increase of farm markets than do agricultural exports; nevertheless, they create demand for farm products, directly through the domestic employment they provide and indirectly through the boost they give to production and consumption abroad. Many countries need industrial goods and services in reconstruction work or in industrial development. Without such aids they might not be able to become customers once more for overseas farm products. Exports of nonfarm products will be important to agriculture in the next few years, even if toward the end of ERP the total falls off. Exports of goods and services both industrial and agricultural will still be large, and will help to sustain our production and employment.

The Trend of Agricultural Production

Farm production has a strong inherent tendency to increase. Farms must usually grow something lest they deteriorate. Moreover, farm operators have an incentive to maintain the volume of their output even when prices fall so that they will at least be able to pay their fixed charges. Farm output in the United States has increased by more than two-thirds since 1910; since 1942 it has been running close to 30 percent above the prewar (1935–39) average. Many of the forces responsible for the increase will continue to operate. It is impossible, of course, to anticipate above-average weather such as helped to boost farm production in the war years. Unquestionably, however, farm mechanization, the use of improved agricultural plants and animals, and the use of fertilizers and modern insecticides will continue. In the next 25 years machinery probably will release an additional 15 to 20 million acres from the production of feed for work stock. Since 1918 machinery has released 55 million acres previously used to support work animals.

Hybrid corn, the chief plant improvement in recent years, is just one among many plant developments that are increasing farm productivity. Hybridization has proved to be a useful tool with other crops such as onions. Sugarbeet growers look forward to the day, probably not far off, when their crop yields will show the lift of hybrid vigor.

Progress has been rapid of late years in the development of improved insecticides and fungicides. It has moved along new paths in soils research—for example, in the use of radioactive trace elements. Other practices will surely increase the volume and lower the cost of farm production—among them drainage, irrigation, soil-conserving and soil-building methods, and the better feeding of livestock. Moreover, these developments will continue to reduce the number of farm workers required for agricultural production.

The extent to which farm production will increase hereafter depends greatly on prices. Will it pay the farmers to increase their outlay for machinery, fertilizer, and other aids to efficient, low-cost production? Up to a point it will, even if prices decline; for it is always important to reduce production costs. Naturally, however, the cost of machinery and fertilizer becomes an obstacle when prices sag.

Experience shows that high business activity does more to stimulate than low business activity does to lessen farm production. A prolonged depression would slow the rate of increase. Yet even with medium or low levels of employment, farm output would continue far above the prewar volume, probably on a level high enough to maintain present rates of food consumption per person. Such conditions would inevitably mean low returns to farmers.

Given a relatively high and stable level of employment, however, farm production will probably increase in line with past trends. As a result the total farm output may increase within the next 25 years by 20 to 25 percent. We shall then have a supply large enough not only to feed our greater population at a higher per capita rate but to provide sizable quantities of cotton, tobacco, wheat, and other crops for export. These quantities can probably be moved into consumption at prices favorable to farmers if employment remains high.

Costs of Farm Production

With output per acre, per worker, and per unit of breeding livestock continuing to increase, the total real costs of agricultural production will increase only moderately above the current level. In other words, the total quantities of land, labor, and other factors used in production will not change very much. However, cash costs may become relatively more important, especially in periods of contraction or depression. Total farm-labor requirements may gradually decline from the influence of mechanization and farm technology in general.

Outlay for machinery and equipment, on the other hand, will probably increase. Probably the farmer will buy more fertilizer and pay out additional cash for interest and taxes. Cash expenditures for farm family living will increase, as farm ways of living become increasingly urbanized. It is the relation of costs to prices that matters, rather than the absolute level of the costs. In price recessions the trend in this relationship turns against the farmers. Hence, the increasing dependence upon purchased items for both production and family living may make farmers more vulnerable to future recessions or depressions.

Another comparatively rigid part in the economic pattern may give the farmers trouble. This is the relationship between prices and the costs of marketing. Three factors mainly determine what percentage of the consumer's dollar goes to farmers: (1) Wages and salaries in the handling, transporting, processing, and distributing industries; (2) the efficiency of these and related distribution functions; and (3) the trend toward an increase in marketing services such as packaging, delivery, quick freezing, refrigeration, and long-distance transport. These three elements are all relatively stable. Hence the changes that take place in the farmer's percentage of the consumer's dollar chiefly reflect changes in farm prices. This has been predominantly so during the 35 years for which statistics on marketing margins are available.

Reduction of Marketing Expenses

It is very difficult to reduce the costs of marketing. Wages and salaries are especially resistant. Reductions must come chiefly through improvements in efficiency, such as may result from better organization and equipment. Marketing services affect marketing costs; but these services, as the term implies, answer normally to consumer wants. Under conditions of active employment and high consumer buying power, their cost will not decline except as ways develop to do them cheaper. Research and service agencies pay increased attention to marketing problems; this is particularly true of the Department of Agriculture and the State agricultural agencies, which have a broad cooperative program. This and other research should help to broaden as well as cheapen distribution. The two benefits usually go together.

Nevertheless, the improvement will be slow. Meantime, past relationships between agricultural prices and the costs of agricultural marketing suggest what may lie ahead. During the last 25 years the farmers have received all the way from 32 to 54 cents out of the average dollar spent for food at retail. The returns have been above 45 cents only in the most prosperous years. Largely, the variation has reflected fluctuations in the farmers' prices; costs of marketing have been relatively stable. The proportion of the consumer's dollar that goes to farmers is an important factor in agricultural well-being, but it is less important than the level of demand.

The Farming Community

In addition to changes in farm output and in consumption and exports of farm products, certain changes will take place within the farming community. Farm population will probably decline, despite higher birth rates on farms than in cities and despite growth in the country's total population. Net migration will be away from farms, as in the past. Change in the farm population will reflect business conditions as well as birth rates. Migration to the town is greater during booms than during depressions. In agriculture's interest, such migration should be large, both to take away excess rural manpower and to increase the number of nonfarm producers and consumers. Migration serves all requirements best when it results on the one hand from technical progress on the farm and on the other hand from expansion in industry.

We must expect changes in the size and ownership of farms. In 1945 according to the census the United States had approximately 5,900,000 farms. Of these, about 100,000 were large units with a gross production of $20,000 or more. Though less than 2 percent of the total number of farms, large-scale units accounted for more than a fifth of total farm production.

At the other extreme were 2,500,000 small farms of a largely noncommercial character. They comprised 43 percent of all census farms, but produced only 8 percent of total farm output. Many were farm residences whose occupants obtained most of their income from nonfarm sources. Many were part-time farms with comparatively little production for the market. Many were so-called subsistence farms—in other words, farms used primarily to produce foods and other products for consumption by the farmers and their families. Usually this type of farming produces only a poor "subsistence," because it fails to provide enough cash income to pay for necessary things which the farms cannot produce.

The core of farm production lay elsewhere. It lay in 3,200,000 farms with a gross value of production in 1944 ranging from $1,200 to $20,000. These were family units in the sense that the operator and his family, with the help of machinery, were able to provide most of the labor required except for peak-load seasonal work. In number they represented 55 percent of all the farms. They accounted for 70 percent of the gross value of all farm production.

This division into size groups is the result of a long evolution, characterized especially by developments that enable the farm operator and his family constantly to expand their operations with little or no increase in hired help. Over the past 25 years the number of small- and medium-sized commercial farms has decreased, while the number of larger farms has increased. This trend is expected to continue, with the average size of commercial farms increasing and the number decreasing.

Farms of the subsistence type have been decreasing in number for some time and the decrease will probably continue. Decline in the number of farms of this type implies farm abandonment or farm consolidation; it may favor an increase rather than a decrease of farm production for the market, since production for sale comes chiefly from the larger farms. Simultaneously, the number of very small land units, such as provide homes for families whose earnings come chiefly from nonfarm work, may increase.

The number of very large units of the type which relies heavily upon hired labor may increase. But the family farm will remain the prevailing business unit in United States agriculture.

Outlook for Immediate Future

In summary, the outlook for United States agriculture over the next two or three decades is basically good. However, the balance between expanding production and expanding markets will be rather delicate. If we are wise enough to maintain a relatively high and stable level of employment, farmers can look forward to much better incomes than they had before the war. But if we again encounter and tolerate wide swings in employment such as occurred during the interwar period, agriculture may again face the problems of the 1930's. The first of these alternatives is in line with the basic trend of our economy prior to 1930. Many of the forces responsible for that trend will be operating during the decades ahead. But we cannot expect to have a golden future served up to us on a platter. It is ours only if we work for it and if we show imagination and courage in dealing with new problems as they arise. In particular, farmers, workers, businessmen, and Government must cooperate in solving our No. 1 domestic problem—that of maintaining sustained maximum employment.

PRODUCTION ON UNITED STATES FARMS IN 1948

Aggregate crop production in 1948, as estimated in November, was the largest on record by a wide margin. Feed-grain production, dominated by a record corn crop, was a new high. Output of food grains was the second largest on record. Oilseed production topped any previous tonnage. There was large production of vegetables and of special crops. Fruit production was only slightly below average. Livestock products continued their downward trend, as a result of the relatively small production of feed grains in 1947. But this trend is likely to be reversed in 1949, because of the huge 1948 outturn of feed crops.

Combined production of all principal crops in 1948, based on preliminary estimates, was 37 percent above the 1923–32 predrought average. It was 11 index points above the previous high mark set in 1946. Contributing to this achievement were record outputs of corn, rice, soybeans, peanuts, and pecans; near-record outturns of wheat, oats, flaxseed, sorghum grain, dry beans, and citrus fruits; a cotton crop one-fourth above the average; and above-average crops of barley, all hay, potatoes, tobacco, sugarcane, sugar beets, hops, peaches, grapes, cherries, apricots, and truck crops. Among the major crops, only rye, buckwheat, dry peas, sweetpotatoes, broomcorn, apples, and pears were below average.

Feed supplies per animal unit became the most liberal in history, though carry-over stocks were relatively small. With livestock numbers the smallest in 10 years, the total supply of corn, oats, barley, and sorghum grain rose to near-record size. Hay was in ample supply, with a large carry-over and an above-average crop, but with the possibility of some shortages in the east north central dairy section, and dry-range areas.

Production of food grains was exceptionally large as a result of a record rice crop and a wheat crop second only to that of 1947. The winter wheat crop totaled nearly one billion bushels; the spring wheat crop, for the first time since 1944, exceeded 300 million bushels. With a larger carry-over than in the two preceding seasons, the supply provided an ample quantity of wheat for domestic use and as much for export as in either of the previous 2 years. Rye and buckwheat, however, were relatively small crops.

In the year's oilseeds production, soybeans and peanuts reached new peaks; flaxseed production was the second largest on record, and cottonseed production was one-fourth above average. In cotton's long history in this country, only six crops of cotton lint have been larger. The yield of cotton per acre was a record, on an acreage slightly above average.

Growing Conditions and Difficulties

As usual, the season included obstacles and difficulties for farmers. Seeding conditions in the fall of 1947 varied widely in different parts of the country. In the South, for example, fall-sown acreages of grain were seriously reduced by heavy rains and waterlogged fields. In the important wheat area of the central and southern Great Plains, on the other hand, the weather was so dry before and during the usual planting period that the preparation of the soil and seeding operations were greatly delayed and a sharp reduction in acreage was threatened.

Helped by the rains that began in mid-November, growers were able to continue seeding beyond the usual dates. Favored by a mild early winter, followed by a sufficient snow cover when frost became severe, late plantings prospered. Fall seeding conditions in most other wheat areas ranged from favorable to ideal and resulted in expanded acreages, which offset reductions in the problem areas. The final result was a record acreage seeded to winter wheat.

Farm activities lagged in much of the country during March. In the South wet fields continued to delay operations and growers there could not augment the reduced fall acreages with spring plantings to the desired extent. Frosts severely damaged oats in Texas and Oklahoma. In California a dry season harmed oats and barley. In the Great Plains dry spring weather threatened late-sown wheat; the root systems were small and penetrated only with difficulty through the surface crust to subsoil moisture. In the latter half of April, however, weather became more favorable. Farmers were able to overcome much of the season's backwardness, though not without some shift from wheat to barley and flax.

The weather in May permitted about usual work and crop growth, though with some deterioration of wheat in the Great Plains. Seeding of spring grains was completed for the most part on time, under satisfactory conditions. Planting of corn was nearly finished by June 1, slightly earlier than usual. Timely rains in late May and June caused winter wheat to produce large, heavy heads of plump kernels with consequently better yields than had been expected. During July growing conditions were in an exceptionally good balance for maximum crop progress. Hot, dry weather in the South was ideal for cotton; yet there were enough showers for corn. In the Corn Belt, small grains and soybeans had sufficient soil moisture to withstand and benefit from heat.

Naturally, there were some drawbacks. Heavy rains delayed the wheat harvest in Kansas, with some loss; a heat wave in the upper Missouri-Mississippi Valley forced some grains to maturity; rains often interfered with haymaking. Nevertheless generally favorable conditions continued through the small-grain harvest and pushed later maturing crops to remarkably good yields. Briefly for the country as a whole, a normal spring developed into an almost ideal growing and harvesting season.

Farmers were able by increased use of power equipment to overcome delays caused by weather. They applied fertilizer materials in increased quantities. Transportation and storage facilities were inadequate, but only negligible losses occurred from the necessity to pile grain temporarily on the ground. After the grain harvests, fall plowing and preparation for the next crop season began rapidly.

Combined Acreage Up Slightly

Combined acreage of all crops for harvest, as estimated on August 1, was nearly 351 million acres—about 2.4 million acres more than in 1947. Except for 1944, it was the largest acreage for harvest since 1932. Planted acreages totaled nearly 363 million acres. Acreage loss, about 12 million acres, was larger than in any of the past 3 years and larger than in 1942, but less than in any other year since 1930. Most of the increase in abandonment over recent years was in winter wheat acreage, much of it subsequently replanted to sorghum and other later crops.

Farmers were able to plant about the total acreage they had planned in March, but with several significant shifts among crops. Nearly a half-million acres of hay meadows, not needed because of smaller livestock numbers, were plowed up and put into other crops. About half a million acres of oats and over a quarter of a million acres of spring wheat could not be planted because of the lateness of the season. On the other hand, planting intentions were exceeded by about 800,000 acres in barley, by half a milion acres in corn, and by more flax, sorghums, dry beans and rice. Cotton acreage was about 2 million acres greater than in 1947. Acreages of most other crops were about those intended.

Preliminary reports indicated about 8.6 million tons of deciduous fruits were produced, about 12 percent less than in 1947 and 18 percent below the 1946 record tonnage. Production of apples, peaches, and pears was considerably smaller than in 1947, while the production of prunes and grapes was slightly smaller. There were more cherries and apricots. Nuts, led by a record pecan crop and a near-record walnut crop, attained a record tonnage. The citrus crop was a near-record. Truck crops for the fresh market and for processing were both above average; the output for fresh market was nearly 2 percent larger than in 1947, but for processing was 8 percent smaller.

Livestock and Livestock Products

Production of livestock and livestock products in 1948 seemed likely to aggregate about 4 percent less than in 1947 and 12 percent less than in the peak year, 1943. Though smaller than in any year since 1941, it will be considerably larger than in any year up to and including 1941. The decline from last year was general in all categories—meat animals, wool, mohair, dairy, and poultry products. The only item expected to show an increase for the full year was commercial broilers. The expected 1948 total of 41.2 million pounds liveweight of cattle, hogs, sheep, and poultry is about 2.4 million pounds less than that of 1947, but considerably more than in any year prior to 1942.

The number of hens on farms declined in 1948, continuing a downward trend from the 1944 peak. In the first 10 months of the year, egg production was 1 percent less than in the same months of 1947, but for the year was likely to equal that of 1947. The number of buyers in October was 2 percent less than in 1947, but the rate of lay was at a record level. Total milk production in 1948 fell off about 3 percent from the 1947 total and was about 4 percent below the record 1945 total. Only in the 4 years 1944–47 has the 1948 production been exceeded. Milk flow per cow was at record or near-record levels during the first 10 months of 1948, but at midyear the number of milk cows was 4 percent below a year earlier.

HANDLING OUR HUGE GRAIN PRODUCTION

Our huge 1948 grain crop, plus near-average western European production, substantially improves world food prospects for 1948–49. Winter cereal crops, which started under poor conditions, improved greatly and are very large in the United States and near-average in western Europe.

The ample 1948 United States harvest of wheat and corn will provide a surplus for export over and above the maximum capacity of our shipping facilities, and this great quantity can be supplied without adding to the cost of living in the United States. These grains are not expected to sell, on an average, above the mandatory price-support level. On the contrary, unless exports are continued at maximum levels, the cost of supporting prices could well become burdensome. Moreover, large quantities taken by the Government would require storage facilities that would be needed by producers during the next harvest.

Record wheat production in 1947 enabled the United States in marketing year 1947–48 to export 480 million bushels of wheat and flour (wheat equivalent), or about 85 million bushels more than in 1946–47. All United States grain exports totaled 580 million bushels, about 7 million bushels above the total for 1946–47. Yet domestic demand for bread grains was amply met as was evident from the relatively large wheat carry-over June 30, 1948, of 195 million bushels. One year earlier the carry-over had been only 84 million bushels. Because the 1947 corn crop was small, exports of feed grains (corn, oats, barley, and grain sorghums) were smaller than in the previous year—approximately 100 million bushels or about 59 percent of the 1946–47 total. Most of the exported feed grain was for human food.

Because the 1947 United States rice crop was the largest on record, the domestic demand for table-quality rice was amply met and the United States was able in 1947–48 to export a record volume—nearly 8.5 million bags (100 pounds per bag) or nearly 5 percent more than in 1946–47.

Excellent growing conditions resulted in United States grain production in 1948 of more than 6.7 billion bushels, plus a near-record rice crop of about 80 million bushels. This was about 25 percent above the 1947 crop and 23 percent above the 10-year average. The corn crop alone totaled approximately 3.5 billion bushels—an all-time record. This production, combined with Europe's near-average bread-grain output, greatly improved world food prospects but not to the point of giving any assurance that world food needs would be fully met. But if our large exportable surplus of grain is to be moved to the areas of greatest need, efficient use of storage, handling, transportation, and port facilities will be required. Otherwise many United States grain growers may receive somewhat less than the price-support levels offered by the Government.

Grain Prices in August

This was evident from prices in midsummer. In August some grain futures contract prices, as well as some cash prices, were 10 to 15 cents per bushel below applicable 1948 crop-loan levels. Simultaneously, a serious shortage of storage facilities for growers developed. Many growers had consequently to sell grain at prices below the equivalent of the 1948 loan rates.

Prices in 1947–48 for most grains approached or exceeded previous highs; but in February a break occurred, followed by a downward trend. Cash market prices for No. 2 hard winter wheat at Kansas City averaged slightly above $3 per bushel in December and January —the highest levels in United States history. Thereafter, prices began to decline, with a drastic break in the first week of February.

Some recovery took place from the low mid-February point for wheat of $2.29½ per bushel at Kansas City, but the downward trend continued. Other cash grain prices followed. Nevertheless, for 1947–48, growers received for wheat the highest United States season average farm price in history—$2.31 per bushel. This price was 15 cents above the previous (1919–20) high average of $2.16, and 40 cents above the 1946–47 average of $1.91.

Wheat-Loan Rates

Government wheat-loan rates to growers in 1947–48, as provided under the Agricultural Adjustment Act of 1938 and other legislation, averaged $1.84 per bushel for the country as a whole, equal to 90 percent of parity. Wheat loan rates will average $2 per bushel for 1948–49, also 90 percent of parity. Whether most farmers will receive this price or near it will depend largely (1) on what develops in connection with the grain-storage problem; (2) on the level of the export demand; and (3) on the level of domestic consumers' incomes. Fulfillment of expected export needs turns on the availability to foreign governments of sufficient dollar exchange and partly on efficient physical handling and shipping of grain and grain products, under conditions of great pressure on storage, railroads, and port facilities.

As to grain prices beyond the current marketing year, it is important to bear in mind that the Agricultural Act of 1948 extends price support to cooperating producers at 90 percent of parity on basic commodities marketed before June 30, 1950, and on later crops provides variable support at from 50 percent to 90 percent of parity, depending upon certain conditions, notably the ratio of the total supply of a commodity in a given year to its "normal" supply. Wheat, corn, and rice are included under this legislation. Thus wheat, corn, and rice growers will have price support at 90 percent of parity on at least one more crop beyond 1948.

Long-Time Export Outlet

A relatively heavy export demand for grain appears likely for the next year or so, even without the help that might accrue to the United States from an International Wheat Agreement. Nevertheless, the long-time export outlook is far from reassuring. As other countries, especially in western Europe, move toward agricultural recovery and rehabilitation they will doubtless try as in prewar years to produce as much as possible of their grain as well as their foods in general. This will be the more likely to happen in the absence of restrictions such as those contemplated in the recently proposed but not ratified international wheat agreement Hence, the United States export market for wheat will diminish, and leave a surplus above domestic needs in periods of large United States crops.

This could lead to a necessity for reinstituting acreage allotments and marketing quotas for wheat and probably for corn and rice. High domestic consumer demand for livestock, dairy, and poultry products might temporarily exempt corn. But governmental controls for rice probably would be required, especially when Asiatic countries again actively seek export outlets. Another large United States grain crop in 1949, along with large carry-overs from 1948, may raise the question of acreage allotments and marketing quotas for all three of these grains. Production and distribution programs and policies must consider this prospect.

SHORTAGE OF GRAIN STORAGE FACILITIES

The handling of our huge grain production this year has given rise to serious problems of storage both on the farms and at terminal markets. As told in detail elsewhere in this report, the combined production of corn, wheat, oats, barley, rice, and grain sorghums is the greatest on record; it is about 1,398 million bushels above that of 1947 and 1,386 million above the 10-year average. By comparison with the prewar (1937–41) period, the increase is 1,806 million bushels, or more than this country's total exports during the last 3 years. Moreover, this record production coincides with some contraction of market outlets. Export requirements will be large during the 1948–49 marketing year; but probably not large enough to absorb the whole quantity available for export. Lack of dollars will force many countries to maintain tight controls on grain imports; also, the urgency of world import needs has declined following a substantial increase in Europe's grain production. Hence, the pressure on grain-storage capacity in the United States is heavy.

Production on United States farms has increased tremendously in recent years, with no corresponding increase in storage facilities. Many farmers, for lack of eligible storage facilities, have not been able to take advantage of Government-loan programs. Much grain has been sold at prices below support levels.

Technical progress on farms, as well as the response of farmers to emergency requirements, tends to complicate the storage problem. Machinery speeds farm work. Largely, it offsets the delaying influences of the weather. Farmers can use machinery 24 hours a day. Especially in harvesting is machinery an antidote to bad weather. Further, machinery increases the proportion of leading crops marketable within a given time and in that way puts stress on already inadequate storage. Moreover, modern farm technology worsens the storage problem in another way. Mechanical harvesting often means harvesting crops too high in moisture content for safe storage.

Purchase agreements have been of particular advantage this year to producers who could not store their grain in eligible storage facilities.

The Purchase Agreement

The purchase agreement, as distinguished from the nonrecourse loan on grain placed in eligible storage, is simply an option to deliver grain to the Commodity Credit Corporation. Its advantage to the producer lies in the fact that it guarantees him a price in line with the price support—in other words a price equal to 90 percent of parity. How he stores the grain before he delivers it is his own responsibility and his own risk. If he cannot get eligible storage in his neighborhood, the purchase agreement though possibly less attractive than a nonrecourse loan may have advantages over sale in the open market. Significant also in connection with the purchase agreement is the responsibility it puts on the grower for conditioning his grain and storing it as safely as possible. Needless to say, the grower who has an option to sell grain to the CCC does not have to sell it to that corporation. He may dispose of it in commercial channels if a good opportunity presents itself and only in the event of a depressed market will he make delivery to the CCC. This gives him an interest in protecting the grain from deterioration and shrinkage.

CCC Facilities for Storage

In former years the Government through the Commodity Credit Corporation was able to provide farmers with ready market outlets by which supplies of wheat, corn, grain sorghums, and other grains could be taken for storage. This function must now be assumed by the producers themselves. The new charter of the Commodity Credit Corporation, as created by legislation at the last session of the Congress, makes it hereafter impossible for the CCC to accumulate and store large quantities of grain in steel or wooden bins. The CCC cannot acquire additional storage-bin sites. As of today, the CCC has about 20,000 bins left with a total capacity of slighly under 50 million bushels.

This Department has directed State PMA committees to tell farmers about the storage problem and to provide them with plans for farm facilities. Agricultural engineers in the Department, technicians in the State experiment stations, the Federal and State extension workers are cooperating. Besides farm storage facilities, both temporary and permanent, the program urges construction of permanent trackside storage in areas of grain-surplus production. Past experience shows the connection between storage facilities and grain prices. Much of the grain delivered to the CCC in satisfaction of nonrecourse loans or sold to it under price-support operations has reflected inadequacy of storage facilities. Better storage facilities would often have provided alternatives to the release of grain at support levels.

THE CHANGING COTTON SITUATION

The cotton situation changed during the 1947–48 marketing season from its favorable position to one of weaker domestic and export demand, declining prices for both raw cotton and textile goods, and large carry-overs.

The large 1948 cotton crop of 15.2 million bales, together with an increase of one-half million bales in the carry-over of cotton on August 1 from last season, will increase the supply of cotton in this country by more than one-fourth above the supply of 14.4 million bales for the marketing year ended July 31, 1948.

Domestic mills consumed 9.3 million bales during the past season, the second lowest quantity since 1940. This was a 7-percent drop from consumption the past season but one-third more than the 1935–39 average. Exports dropped from 3.5 million bales in the 1946–47 season to 2.0 million bales, or more than 40 percent. Exports were the lowest for any year since the Civil War and were only 40 percent as large as the 1935–39 average. Scarcity of dollar exchange in importing countries, trade restrictions, use of surplus stocks from the previous years' exports, less-than-expected progress in recovery of textile mills, and slow progress in getting ECA in operation, combined to reduce exports.

Cotton prices in the 10 spot markets have declined from the peak levels reached in April and May of last season and have been at or slightly above support-price levels since the beginning of the 1948–49 marketing season. The prices for Middling 15/16-inch declined 3.06 cents per pound in July and an additional 1.49 cents in August. The average price for Middling 15/16-inch cotton was 31.03 cents per pound on September 1, or 2.21 cents less than the price a year ago.

The 1948 loan rate of 30.74 cents per pound for Middling 15/16-inch cotton is only 3.8 cents below last season's average 10-market price for this quality and 1.2 cents less than the average farm price. Even with the decline in cotton prices, producers should obtain a greater gross income from the 1948 crop than last season. The gross income should be about triple that received from cotton in the 1935–39 period.

Demand Begins To Weaken

The past marketing season experienced a weakening in demand for cotton goods in both the domestic and export markets. The textile market appears to be in passing more or less from a "sellers" to a "buyers" market. The wholesale prices of several important unfinished cotton fabrics declined as much as one-fifth or more and one or two as much as one-third during the season. Exports of cotton textiles declined throughout the year from the peak exports reached in the spring and summer of 1947. The monthly rate of textile exports fell from 147 million square yards in May 1947 to 81 million square yards in May of this year. However, exports are still large as compared with the prewar average.

Cotton acreage has been climbing each year in the postwar period. The estimated 23.6 million acres of cotton in cultivation on July 1, 1948, is 10 percent larger than the 1947 acreage and is 30 percent above the 1946 acreage. The acreage is about the same as the average acreage in the 1939–42 period but is about 17 percent below the 1935–39 average. The indicated 1948 cotton yield of 313 pounds per acre is a record high and is about 14 pounds above the previous high, which was in 1944.

Cotton textile mills in the United States consumed about 700,000 fewer bales of cotton in 1947–48 marketing year than during the previous season. Even with the 7-percent reduction, mill consumption was still above the 1935–39 average and ranked third in peacetime consumption. The decline in consumption from the 1946–47 season was caused by smaller exports of cotton textiles toward the end of the season and filling up deferred demands caused by the war. Progressive recovery of textile manufacturers in war-torn countries, construction of textile mills in cotton-producing countries, and scarcity of dollar exchange in importing countries were major causes for the decline of textile exports.

Domestic Consumption of Rayon

While domestic cotton consumption decreased in 1947–48, consumption of rayon continued to increase. Average monthly deliveries of rayon to consuming establishments for the first half of 1948 were higher than for the same period in any previous year and about three-fourths greater than in 1942. Monthly shipments have averaged 89.2 million pounds this year compared with 75.4 for the same period in 1947, 69.7 in 1946, and 51.2 in 1942. At the current rate, rayon shipments should exceed 1 billion pounds in 1948 for the first time in any calendar year. This is three times the 1935–39 average and is equivalent to 2.35 million bales of cotton.

World Crop of Cotton in 1947–48

The total 1947–48 world cotton crop of 25.3 million bales, 480 pounds net weight, is 17 percent above last season but 20 percent below the 1935–39 average. The increase from last season was largely accounted for by the gain in United States production. Small increases were obtained in Russia and China, with no changes in production in other major cotton-producing countries. The decline in world cotton production since 1935–39 is almost entirely accounted for by reduced crops in the six major producing countries. The proportion of the total world crop grown by the United States increased from 41 percent in 1935–39 to 47 percent in 1947–48.

Prices of most foreign cottons have held firm or increased, while the prices of American cotton have declined. Prices for most foreign cotton are higher in relation to American cotton than at any time since the entry of the United States into World War II.

Cotton in ECA Program

Cotton is an important commodity in the ECA program. Since the European countries are not generally able to buy American cotton, producers in this country have a special interest in the program, which should assist in keeping export outlets for their cotton to European countries. This year's large cotton crop—about three-fifths greater than present domestic consumption—is a reminder of the need for retaining and finding new cotton exports to prevent piling up of cotton surpluses in the years ahead.

There is a possibility that as much as one-eighth of the sum appropriated to finance ECA may be used to export American cotton. Shipments of cotton from the United States might run more than 10 million bales over the 4¼ years ending June 30, 1952, or the operating period of the ECA. The amount will depend on future levels of production, future import requirements, future stocks, and prices of cotton. The size of the annual appropriations after the first 15 months, the activity of nonparticipating countries in the cotton market, and private financing are other major factors affecting the amount of cotton exports under ECA.

Cotton purchasing under the ECA has been placed in the hands of private trade, except for countries to which such channels are not available. Thus, the Government's role in trade has been reduced to principally financing.

The Economic Cooperation Administration authorized 68 million dollars for purchases of cotton to July 30, ranging from 25.8 million dollars for France to 0.6 million dollars for Norway. Other countries authorized to purchase cotton were Austria, China, Italy, Norway, Bizone Germany, and French Zone Germany.

Competition of cotton grown in foreign countries, expansion of cotton manufacturing in raw-cotton-producing countries that formerly imported textiles, and competition of synthetic fibers in the United States and in foreign countries offer the greatest challenge ever experienced by producers of cotton. The world's production of rayon in 1947 was equivalent to 4.7 million bales of cotton. It was 4.4 times as large as that in 1930 and slightly above the 1938 production, when Germany and Japan were producing at record prewar levels. Rayon production in this country has increased 7½ times since 1930 to an equivalent of 2.3 million bales of raw cotton in 1947. Production of other synthetics is rapidly increasing. Paper is cotton's second greatest competitor.

Cotton production outside the United States rose from 10½ million bales in 1932 to 18½ million bales in 1936 and stood at 12.9 million bales in 1946. To meet this challenge, a balanced program for cotton will need to be followed. Lowered cost of production through better farming practices and continuous research, improvements in processing, finishing, and marketing from farm to consumer to keep pace with advancement of competitive products, and new outlets are only some of the sides of this problem.

IMPROVED OUTLOOK FOR LIVESTOCK

Record feed crops are in prospect, in contrast to the small harvests of feed grains last year. Large feed-grain harvests assure increased meat production by late 1949. Meat supplies more nearly in balance with consumer demand should check the rise of meat prices, which has been under way since 1946.

The record corn crop of 3.5 billion bushels, together with large crops of oats, barley, grain, sorghums, and oilseeds, and an abundance of hay and forage, will provide feed supplies per animal unit far above those of any previous year. Farmers will be able to feed their livestock to heavier weights, and to raise more livestock, particularly hogs. The immediate effect may be some reduction of meat supplies in late 1948. Considerably more meat will be available, however, in late 1949 and thereafter.

With feed more plentiful, feed prices during the 1948–49 feeding season will be low in relation to hog prices. Farmers will breed more sows. The pigs will be ready for market beginning in the fall of 1949 and continuing through 1950. More pork will lessen the pressure on the cattle industry. It will then be possible for cattlemen to start rebuilding their herds, so as to insure adequate beef supplies in the future.

Smaller supplies of livestock for slaughter and increased demand for meat, with a rise in prices both of meat and of livestock to the highest levels of record featured livestock developments in 1948. Slaughter of cattle and calves in 1947 totaled more than 36 million head. It was a new peak and exceeded the calf crop by 700,000 head.

As a result, cattle numbers at the beginning of 1948 were down 2.6 million from the preceding year. They were 7 million head below the peak reached 3 years earlier. The reduction was mostly in dairy cattle and in steers and young beef stock. The beef cattle breeding herd declined only slightly and was still nearly 60 percent above the prewar average. Briefly, the cattle industry in 1948 was able to produce relatively large numbers of beef cattle for future slaughter though its reserves for current consumption were down considerably. Liquidation of dairy stock continued, as shown by a relatively large slaughter of calves and of the lower grades of cows.

Slaughter of cattle and calves in 1948 may total some 33 million head, about 3 million less than the previous year's record slaughter. Slaughter of hogs and sheep likewise will be less than in 1947. In hogs the reduction reflected last year's poor corn crop. Farmers marketed 1947 spring pigs early and carried less than the usual proportion of the crop over into the succeeding year. The scarcity of feed also caused farmers to reduce pig production in the fall of 1947 and in the spring of 1948. In consequence the supply of hogs for slaughter in 1948 fell off and in addition the weights were lighter.

Smaller slaughter of sheep and lambs reflected a great reduction in sheep numbers that began in 1942. Sheep numbers are now the smallest in more than 80 years. The 1948 lamb crop is the smallest since 1924. Sheep and lamb slaughter is now at about the level of 20 years ago. It will decline further during the next few years if sheepmen hold back lambs increasingly to rebuild their flocks. Steps to keep more breeding stock were in evidence this year in a number of States. Expansion of flocks in the near future, however, probably will be moderate.

This year's decrease in livestock slaughter as compared with that in 1947 may involve a decrease of about 8 percent in the total meat production during the year. Total output may be about 21 billion pounds—about 2 billion less than last year's. This quantity will permit an average per capita consumption of about 145 pounds, as compared with a prewar average of 126 pounds and last year's total of 155 pounds. Consumption per capita in 1947 was the largest since 1908. Slaughter in the first quarter of 1948 production was down about 7 percent from that of the corresponding period in 1947. Production in the last quarter, though seasonally larger than in the third quarter, may show a decrease of possibly 10 percent or more from that for the corresponding period in 1947.

In the third quarter of 1948, meat prices reached all-time-high levels at both wholesale and retail. They reflected not only the relatively small supply of meat available but also the high level of consumer incomes. Consumer incomes in the second quarter of the year reached a new high at about 10 percent above the same period of 1947. Normally, consumers spend about 6 percent of their disposable income for meats—beef, veal, pork, mutton and lamb. This percentage holds fairly constant regardless of changes in the meat supply. High consumer income results from a high level of employment and when this occurs, as it has this year, consumers spend more than the usual proportion of their income for meat. Apparently the lower income groups compete more actively for a larger proportion of the meat available. Whether or not the expected increase in meat production toward the end of 1949 results in some decline of meat prices will depend to a considerable extent, of course, on what happens to employment and consumer buying power. Naturally, a further increase in disposable incomes could offset the larger meat supply.

DAIRY PRODUCTION, CONSUMPTION, AND EARNINGS

Milk production in 1948 will show a further decline from the peak reached in 1945. The number of milk cows is dropping and in comparison with that of recent years the 1947–48 feed supply was smaller. On January 1, 1948, the number of milk cows and heifers 2 years old and over on farms was reported as 25,165,000—3.5 percent less than the number a year earlier, and only slightly greater than the January 1 average for the period 1935–39. Moreover, the first part of 1948 saw a reduction in the quantity of grain and concentrates fed per cow. On the basis of information available in July, the Department estimated that milk production on farms in 1948 might decline by 2.5 billion pounds or more under the 119.3 billion pounds produced in 1947.

Output of milk per cow was smaller in the early months of 1948 than in the corresponding months of 1947, but with the advent of good pastures the rate during the flush season was at or near the record high level of the previous flush season. On an annual basis, a peak of 5,000 pounds per cow was reached in 1947. It appears that this high rate may be again approximated in the current year. Crop reports in August indicated a considerable increase in the supply of feed grains. It is therefore expected that the milk-feed ratio will be more favorable to the dairy enterprise in the coming months than it was early in 1948. Milk production in the years immediately ahead may also reflect the fact that on January 1 last, though the total number of cows and heifers on farms was lower than a year ago, the number of heifers 1–2 years old was about 1.5 percent higher. This is the first January 1 increase in replacement stock since 1944. Briefly, the situation includes some factors that may check the downward trend in milk production.

Cash receipts from dairy products will be higher in 1948 than they were in 1947. In the first half of the year, prices of milk and cream and of manufactured dairy products averaged about 15 percent higher than in the previous year, with only slight declines in the period of flush production. Study of supply-demand prospects suggested the prices paid to producers for milk and cream would continue high throughout the year. In the January-June period, cash receipts to farmers for dairy products were about 8 percent higher than in the first half of 1947. Midyear indications were that the gross cash income from farm sales of milk, cream, and butter in 1948 would exceed those of 1947 despite some decline in the volume of farm marketings. It seemed unlikely, however, that the expected increase in the gross cash income would have an equal counterpart in the net returns to dairymen because of higher costs of production and marketing.

Whole Milk Proportion in Sales

Farmers continue to increase the proportion of their dairy output sold as whole milk. This is a factor in the recent increase in cash receipts or gross cash income. In 1947, about 72 percent of all the milk sold from the farm was sold as whole milk, compared with an average of only 50 percent in the period 1935–39. Up to midsummer in 1948 the proportion sold as whole milk ran higher than in 1947. Marketing in this form promotes more effective human use of the milk supply. It is noteworthy, for example, that the per capita consumption of fluid milk and cream in 1947 was 398 pounds (whole-milk equivalent), or about 14 percent above the 1935–39 average. In 1948, up to midsummer, the consumption of fluid milk and cream was close to 1947 levels; the decrease in milk production showed up chiefly in decreased production of manufactured dairy products.

Notably, the consumption of butter continued to decline. Preliminary estimates for 1948 indicated a per capita consumption of only about 10.2 pounds. This compares with 11.2 pounds in 1947 and an average of 16.7 pounds for the period 1935–39. Production of ice cream in the first half of 1948 was about 10 percent under that in 1947. On the other hand, the per capita consumption of cheese remained at the high 1947 level of about 7 pounds per capita. It was about 27 percent above the 1935–39 average. Possibly the high consumption of cheese results from the combination of meat scarcity and high consumer incomes. The consumption of condensed and evaporated milk in 1948 may equal or exceed that of 1947. Storage stocks of dairy products on July 1, 1948, in terms of the total milk equivalent, were less than on July 1, 1947, but above the prewar average. Exports of dairy products in the fiscal year 1947–48 were somewhat below those of the previous year.

FRUITS AND VEGETABLES

Fruit and vegetable production in 1948 is expected to be somewhat smaller than the record production of 1946, but near the level of recent years. The production of vegetables and deciduous fruit is somewhat lower than the record highs but the crop of citrus fruit continues to increase. Continuance of favorable weather should give a supply of fruits and vegetables for processing to provide an over-all pack somewhat smaller than that of 1947. Citrus production in 1947–48, marketed mostly in 1948, was nearly as large as the previous season's record total; the production of grapefruit was larger, while that of oranges and lemons was smaller. It seemed likely in midsummer that the decidous fruit crop would be about one-tenth below that of 1947 or a little below the average. Cherries and apricots were exceptions to the forecast of smaller production. Strawberry production was more than twice the wartime low of 1944 and nearly up to prewar (1935–39).

Consumers were eating more fruits and vegetables than before the war. This is a continuation of a long-time trend, and the increasing importance of fruits and vegetables in the country's diet is indicated by the increase of about 33 percent in the per capita consumption of fruit and 47 percent in that of vegetables (excluding potatoes) as compared with the period immediately preceding World War I. This is the sharpest increase for any of the food groups. Much of the increase in consumption of fruits and vegetables was in the canned and frozen forms.

The sharp increase in production of fruits and vegetables has been accompanied by an increase in the proportion of the production used for processing. Over the past 40 years the canning of fruits and vegetables has increased severalfold, and the production of frozen fruits has risen sharply in the past decade. The development of canned citrus juices and frozen fruits and vegetables is of comparatively recent origin.

During the war years there was a sharp increase in the packs of processed fruits and vegetables. Although the quantities processed increased sharply during the war, large quantities were required for the armed services. Packs continued high immediately following the war because of the high level of domestic consumption and the need to rebuild supplies in normal trade channels. In the past 2 years (1947–48) the pack of canned and frozen fruits and vegetables has shown some reduction in line with a readjustment of supplies to present demands. Acreages of processing vegetables planted by growers have been reduced. The production of fresh vegetables also has shown some declines from the highs occasioned by wartime demands.

The major trouble spots are in dried fruits and in citrus. The former arises mainly because of the loss of the export market. The problem on citrus arises from the increase in planting and the larger bearing surface of the older trees. The development of new outlets for this increased production is the major problem in the citrus industry.

Long-Time Trend

In the last 40 years or so the production of deciduous fruit has just about kept pace with the growth of population; it has increased 50 percent and adjustment of deciduous production to lessened export demand continues to be a problem. Before World War II, exports took about one-sixth of the deciduous production. This included more than one-third of the dried fruit production, one-tenth of the apples marketed fresh, and relatively small quantities of other fruits. The war sharply reduced commercial exports, especially to Europe, but considerable quantities of some fruits were moved under lend-lease. After the close of the war there was some resumption of exports. Apple exports from the 1946 crop were about 5 million bushels or nearly half prewar exports. Although exports of dried fruits increased, they fell far short of the prewar average. Exports of apples, dried fruits, and some others declined again in the 1947 season, partly because of exchange difficulties of importing countries. This aggravated the marketing problem for these fruits, production of which was developed when there was a flourishing foreign market. Exports in the 1948–49 season will depend considerably upon how much fruit can be moved through the ECA program.

Production of dried fruits, principally raisins and prunes, with relatively smaller quantities of others, has been comparatively stable in recent years though at a level about two and one-half times that of the period 1910–14. The marketing of this production requires a considerable export market; our exports of dried fruit (exclusive of dates and figs) took more than one-third of the production on the average before the present war. In the war years, the armed forces, Government agencies, and relief organizations absorbed huge quantities. Currently, the dried-fruit industry, with a production far in excess of the domestic need, faces a very difficult export problem. Last year the Government purchased substantial quantities for relief shipments and for the school lunch program; this year considerable quantities will probably continue to go abroad in the European Recovery Program.

Citrus production has virtually doubled every 10 years for the past four decades. Small before World War I compared with that of other fruits, it is now equal to three-quarters of the noncitrus fruit production. Moreover, large plantings in recent years, along with growth in the bearing surface of young trees, mean that citrus production will continue upward. Expansion probably will run ahead of normal marketing and distribution, and call urgently for new outlets. The United States produces about half of the world's production of oranges and lemons and nearly all its grapefruit; but world-market outlets have declined.

Processing now absorbs about a third of the citrus output, as compared with less than one-tenth of a much smaller production 10 or 15 years ago. Fortunately, the rapid development of processing techniques continues, though not without causing some new problems. Government buying of citrus in recent years, for school lunch and relief-shipment purposes, has partly relieved the pressure of supplies on markets. For example, the Government purchased the equivalent of 8½ million boxes of fresh fruit from the 1947–48 crop. It will take a portion of the new crop for school lunch and possibly European recovery purposes. But even large shipments to Europe, combined with well-maintained domestic distribution, will not wholly free the citrus industry from the necessity for making some adjustments.

Fruit Prices Down From Wartime High

Fruits are one of the few farm food commodities to drop substantially in price from their wartime high. Prices received by growers for the 1947 fruit crop were about one-third lower on the average than the wartime high for the 1945 crop but still nearly twice the prewar average. In contrast, prices for other farm food products rose higher in 1947 to a level about two and one-half times the prewar. Some rose even higher in 1948. Even though prices for fruits and tree nuts were lower in 1947, cash income from marketings was nearly 1.4 billion dollars from the 1947 crop. This was a drop of about 20 percent from the 1946 income. However, it still was three times the prewar (1935–39) average. Costs of production have continued high, so that net incomes have been greatly reduced in many cases.

Vegetables for Fresh Market and Processing

Production of vegetables for the fresh market and for processing in 1948 is expected to be somewhat lower than in 1947 and the record

1946 crop. Annual farm value of commercial vegetable production since World War II has exceeded 800 million dollars. Commercial vegetables for the fresh market and for processing have occupied close to 4 million acres since the end of World War II, not including so-called market gardens. This is about three times the acreage devoted to that purpose immediately after World War I.

Acreage for the fresh market has been as high as 2 million acres, as compared with only half a million acres just after the First World War. In processing vegetables, 1946 was the high-acreage year; the area planted then to processing vegetables was well over 2,000,000 acres as compared with about 800,000 acres in 1919. The pack of canned vegetables has increased tremendously—262[1] million cases in 1946 against less than 70 million before World War I. Expansion of the quick-frozen vegetable pack has been an outstanding development. This pack has grown from almost nothing 15 or 20 years ago to above 450 million pounds, most of it in consumer-size packages. Prospects are favorable for continued high consumption of both canned and frozen vegetables, and total stocks are not excessive. Production of dehydrated vegetables, however, is declining. After jumping from less than 5 million to about 200 million pounds, it fell back and in 1947 was down to about the prewar level.

Problems of Fruit and Vegetable Growers

Expansion in agriculture commonly generates problems, and the fruit and vegetable branch of production is not exempt. Producers face problems simultaneously in production, marketing, and crop utilization. Among the more urgent are the improvement of quality, the prevention of spoilage, the development of new or improved uses, adjustment to new developments in processing and packaging, reduction of marketing costs, the better control of harmful insects and plant diseases, and the adjustment of supplies to demand conditions at home and abroad. Accordingly, this Department and the affiliated State agricultural agencies are doing research under the Research and Marketing Act, along lines recommended or approved by producer-industry advisory committees.

One project inquires whether it is better to pack certain products in consumer-size packages near the points of production or in terminal markets; another tests the merits of wrapping materials and methods of preparing produce for the market; another seeks to encourage the adoption of less wasteful handling practices for fresh produce, particularly at the retail level; another deals with stem-end rot of citrus fruit, bacterial soft rot of vegetables, blue mold rot and gray mold rot of pears. Other studies involve containers, ventilation, refrigeration, and heater services; still others seek new uses for vegetable wastes, such as the leafy portions. Leaf meal from broccoli, beets, turnips, carrots, and the vines of peas and beans has proved food value; it remains to determine the commercial cost.

Because of imminent excess citrus production, investigators seek new and wider uses for citrus products, as the culmination of great past achievements along this line. Research on deciduous fruits among other things emphasizes the prevention of waste. Cooperative studies look for profitable uses for lower grade fruits. Physical handling of fruits and vegetables is expensive and often inefficient; marketing research deals among other things with construction requirements, especially at secondary and terminal markets and at concentration points. One important project is to find out how we can expand exports to Europe. General distribution, with its dependence on consumer preferences and on consumer buying power, receives attention. This work should develop numerous practical findings and proposals, which in combination will help to keep production and marketing in step.

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[1] Excludes soups, baby foods, and baked beans.

POTATO PRICE-SUPPORT PROGRAMS

Operations under potato price-support programs have been an item of major importance since 1943.

The preceding annual report in a section on potatoes covered roughly from mid-September 1946 through July 1947. It described the 1946 crop operations and the 1947 crop operations through July. As a basis for bringing the story up to date, it will be useful to recall the highlights of 1947.

As of July 1, 1947, the crop that year was estimated to be only 352 million bushels, or 124 million bushels less than in 1946 and 24 million bushels less than the 10-year (1936–45) average. Subsequently, however, growing conditions improved and successive monthly estimates raised the indicated total production to a December final figure of 384.4 million bushels, or about 32 million more than the quantity anticipated in August. It has been assumed in recent years that about 375 million bushels of potatoes can be consumed domestically each year at prices reflecting 90 percent of parity to growers. Consequently, it would appear that 9 million bushels was about the surplus in the 1947 crop.

Actually, the 375-million-bushel assumption presumes substantially perfect distribution of production from the standpoint of location and maturity. Parts of the early crop overlapped more than is considered normal. Late-crop production in the western third of the country was noticeably less than normal, while in the central part the late crop was approximately equal to requirements and in the East very much greater. This abnormal pattern of production created a surplus problem in spite of the fact that western areas, especially the Pacific coast, could have used substantially larger quantities than were available there.

From the beginning of 1947 support operations through June 14, total purchases by the Department of Agriculture from the 1947 crop amounted to 33.4 million bushels. Some 31.9 million bushels were disposed of in useful outlets. Less than half a million bushels were lost for lack of outlets; the rest were put into storage for later disposition. The loss figure is particularly significant because the losses all occurred from May until July of 1947 and did not increase subsequently. Disposition of the remainder without further losses from lack of outlets was ground for satisfaction.

According to preliminary data, the 31.9 million bushels usefully disposed of went into the following channels:

	Bushels
Direct distribution	3,500,000
Livestock feed	2,300,000
Alcohol	7,100,000
Dehydration	1,000,000
Export	4,300,000
Flour	3,500,000
Starch	2,500,000
Interim aid	7,600,000
Other [1]	1,000,000

[1] Includes small quantities for meal and soup or pancake mix as well as quantities for which disposition has not yet been reported.

In addition to quantities actually acquired and disposed of, potatoes were processed into starch under the Diversion Program in Maine. Under this program approximately 2.1 million bushels of potatoes were diverted through June 12, 1948. Total disposal operations, through both acquisition and diversion, amounted to 35.5 million bushels.

The Secretary's Recommendations

On November 26, 1946, the Secretary of Agriculture suggested to the chairmen and the ranking minority members of the congressional committees on agriculture that a conference be held to consider support policy. He pointed out that under certain conditions and for certain commodities price supports may prevent the adjustment of production to peacetime needs and that the resulting administrative problems are likely to be numerous and difficult. He said that a repetition of potato difficulties such as occurred in 1946 was possible and urged an early and thorough examination of the question with a view to the discovery and adoption of ways to reduce the costs and wastes involved in carrying out support on the prescribed basis.

On February 26, 1948, the Secretary again addressed letters to the chairmen and the ranking minority members of the House and Senate committees on agriculture. He requested early congressional consideration of questions related to legislative price support provisions, with particular reference to potatoes. He referred to the earlier letters and to testimony given before the Senate and House committees on support in general and potato problems in particular. He explained that the Department was not suggesting repeal of the price-support legislation, which in fact he considered farsighted and necessary, especially for the postwar period of readjustment to peacetime schedules.

Influence of Legislation in 1948

Legislation recently approved should materially affect the potato situation. The Agricultural Act of 1948 continues support at 90 percent of parity for potatoes harvested prior to January 1, 1949, but provides for flexibility in the level of support between 60 and 90 percent of parity for subsequent crops and authority for the control of acreage and marketing practices. Bills leading to this act already have been the subject of reports by the Department. It suffices to say here that departure from the inflexible 90 percent of parity support level will aid in reducing much of the cost and waste inherent in potato-support operations on the present basis.

For the future, looking to both the public interest and to the private interest of the potato industry, the Department believes that if and when supplies of potatoes exceed consumption requirements, means should be available to assure consumers the best of the crop, so that nonfood utilization will take only the poorest portion. Marketing agreement and order programs are admirably suited to this purpose, since they provide a basis for regulating shipments of potatoes by grades and sizes. Such programs are initiated and to a large extent operated by the potato industry, and have sufficient flexibility for successful operation under all conditions of supply and demand. Within the past year, marketing agreement and order programs affecting potatoes have been revived in three areas, namely, Michigan, Wisconsin, and North Dakota; Idaho and Malheur County, Oreg.; and the Klamath Basin area of Oregon and California.

Programs for Particular Areas

New programs have been developed for South Dakota and the important commercial producing counties of North Carolina and Virginia. A program is well on the way toward development in Maine. The Department believes these efforts by the industry to help itself by improving the quality of potatoes reaching consumer markets will result in valuable long-time benefits to both producers and consumers. A proposal to make such programs a condition precedent to price-support operations in any area was made during consideration of the Agricultural Act of 1948, but was omitted from the bills as amended and passed.

Use of factory equipment to make flour from surplus potatoes is a recent move for European relief. Using previously idle machinery at distilleries and food-processing plants has multiplied potato-flour output severalfold. Potato bread has been important in central Europe for centuries; potato flour is a welcome supplement to grain flour. Normally, the United States produces about 15,000,000 pounds of potato flour annually. The Commodity Credit Corporation recently offered to buy up to 448,000,000 pounds for relief feeding in Bizone Germany.

Work at the Eastern Regional Research Laboratory of the Bureau of Agricultural and Industrial Chemistry has increased our production capacity. Scientists at the laboratory have assisted processors and distillers to convert washers, cookers, and drum dryers to the new purpose. Capacity to produce potato flour has already jumped to more than 150,000,000 pounds annually.

WOOL PRODUCTION CONTINUES TO DECLINE

Domestic wool production declined for the sixth consecutive year in 1948. Production of about 290 million pounds was almost one-third less than the 1935–39 annual average and the smallest since

1924. Wool production in 1949 may be slightly smaller than in 1948 because of the reduced lamb crop, which was 8 percent below that of 1947. The sharp decline in domestic wool production since 1942 reflects a reduction in sheep numbers of about 38 percent. On January 1, 1942, stock sheep on ranches and farms in the United States totaled 49.3 million head. By January 1, 1948, the number had declined to 30.5 million, the smallest in the 82 years for which records are available.

The drop since 1942 has been greatest in the North Central States, where numbers decreased 46 percent, and smallest in the South Atlantic and South Central States, where the decrease was 28 percent. Unfavorable conditions in the industry during the war and an uncertain postwar outlook for wool prices, associated with the accumulation of large surplus stocks of wool in this country and abroad, were mainly responsible for the sharp decline.

The outlook for domestic wool growers improved considerably during 1948. World demand for wool, particularly of the finer grades, continued strong, and, as a result, liquidation of surplus world stocks proceeded at a rapid rate. Prices of fine-grade wools of the type which are usually in greatest demand in the United States continued to advance in foreign markets during the first half of 1948. The duty-paid prices of most qualities of fine imported wools were considerably above the support prices of similar domestic wools.

Consequently, growers obtained higher prices for such wools through direct sale to mills and dealers than they could have obtained through the price-support program. Under legislation enacted in 1947, farm wool prices during 1948 were supported at a general level as high as that of 1946. The high open market prices also enabled the Commodity Credit Corporation to reduce its holdings substantially. Prices received by growers for wool in August, however, were still somewhat below their prewar relationship to the general level of farm-product prices.

Under the provisions of the Agricultural Act of 1948, the price of wool is to be supported at the 1946 price-support level until June 30, 1950. The bill further provides that after January 1, 1950, wool be supported under the "flexible parity" system and at such a level, not less than 60 percent and not more than 90 percent, as may be considered necessary to encourage an annual production of 360 million pounds of shorn wool.

POULTRY

The poultry industry operated during the fiscal year 1948 with price levels somewhat lower than the average of all agricultural prices. Whereas the parity ratio for all agricultural products was 118, the corresponding ratio for eggs averaged 92 percent of parity, for chickens 98 percent, and for turkeys 102 percent. These discrepancies reflected relatively greater production of poultry products than of all agricultural products combined. Compared with 100 for 1935–39, the 1947 output of all food products was 141. In the same 12 months the production index number for eggs was 152, for chickens and broilers 151, and for turkeys 174. Poultry and egg production rose phenomenally during the war years from the combined influence of large civilian, military, and lend-lease demand. It has remained at a relatively high level since then as a result partly of an egg-price support program at 90 percent of parity, and partly of a shortage of red meats.

As a result of low prices, particularly in the Middle West, the Department at times during the fiscal year 1948 had to support egg prices. An egg-price support program which had been started in the spring of 1947 carried through into July, the first month of the 1948 fiscal year. With seasonal declines in production, support operations ceased temporarily. Egg prices during the early months of calendar year 1948 rose slightly above the support level. This suggested that civilian demand would be strong enough to make price-support purchases unnecessary during the spring months. In early May, however, price levels in the Midwest declined enough to carry the national average below 90 percent of parity. As required by legislation, the Department started a purchase program. It offered to purchase dried eggs, with the proviso that processors should pay not less than 35 cents per dozen at the farm. This program halted the price decline and soon raised prices in the great egg-producing areas of the Midwest sufficiently to bring the national average up to support levels. By the end of the fiscal year 1948 contracts had been entered into for the delivery of 7,396,000 pounds of powder, the equivalent of about 740,000 cases of eggs.

Despite the necessity for price-support operations both at the beginning and at the end of the fiscal year, national production for the year as a whole was not excessive.

Influence of Feed Prices

Among other factors, high feed prices have influenced farmers to raise 15 percent fewer young chickens this year than last year. Significantly, the reduction has been greatest where egg prices have been lowest, and where price supports have been in operation—primarily in the Great Plains from North Dakota to Texas and secondly in the Grain Belt as far east as Wisconsin and Illinois. Farmers in the West North Central States reduced their chicken numbers by 25 percent. Consumption of poultry is still significantly higher by comparison with prewar levels than the consumption of other meats and of all food products.

This large consumption has been made possible by ample production and by a reduction in poultry price levels as compared with those of meats. Consumption of chickens and turkeys combined had increased about 35 percent in 1947 above the average of 1935–39, with meat consumption simultaneously increasing only 23 percent. Nevertheless, total retail expenditures for poultry percentagewise increased slightly less than total expenditures for meats. Aided by extensive improvements in their production methods, specialized producers of broilers increased their output substantially during the latter half of the 1948 fiscal year. Turkey production during the same period showed a marked decline, engendered by high feed prices and an unfavorable turkey-feed ratio in late 1947.

TOBACCO

The United States is the world's leading tobacco producer, consumer, and exporter. Its annual harvest of tobacco in the past few years has averaged over 2 billion pounds, or about 30 percent of the world total. The country's consumption of domestic leaf is now about 1.4 billion pounds (farm weight) annually. Its postwar exports of 0.6 billion pounds have constituted about 60 percent of all leaf tobacco entering world trade.

Exports declined during and spurted after World War II. Subsequently, as a result of a shortage of dollar exchange in tobacco-importing countries, they declined again. The export movement has always been changeable and, for most types of tobacco, will doubtless continue so. It will play a big role in determining needed production adjustments in the United States. In domestic consumption the trend has been upward for many years. Some further increase may occur, though at a rate below the recent average.

As a result of stock accumulation caused by curtailed exports after July 1947, the United States tobacco acreage was reduced in 1948. Acreage allotments under the Agricultural Adjustment Act of 1938 as amended called for decreased acreages for tobacco under quota, which included all types except Maryland, Virginia sun-cured, and cigar types. The 1948 allotment for flue-cured leaf, the principal export type, represents a reduction from the 1947 acreage allotment of 27.5 percent. For fire-cured types, which have been second to flue-cured in volume of exports, the reduction was 35.0 percent. The acreage for dark air-cured types is reduced by 25.0 percent, and Burley by 2.2 percent. Growers planted a higher percentage of their 1948 allotments than was the case in 1947 and for some types yields per acre are forecast slightly above those of 1947.

The combined production of these types is expected to be only about 18 percent below the 1947 harvest. Production of all types of leaf was forecast on July 9 at 1,757 million pounds, which is 17 percent below the near-record 1947 harvest of 2,108 million pounds. As a result of lower 1948 production, supplies of leaf, including carry-over from 1947 and earlier crops, are believed to be about in balance with requirements for export and domestic consumption. Domestic consumption is expected to continue at the high level of recent years and, as a result of substantial shipments of tobacco under the European Recovery Program, 1948–49 exports will be above the movement in 1947–48.

Our Foreign Customers

Countries participating in the European Recovery Program normally take about 70 percent of United States leaf exports, the United Kingdom alone accounting for about 50 percent. China, which is also receiving economic assistance from the United States, is a large importer. Tobacco is important to these countries as a source of government revenue and as a consumer item to encourage increased economic activity. In 1947 over 20 percent of Government revenue collections in Austria, Ireland, and Italy was from import duties and internal taxes on tobacco. For the other countries, the revenue derived from tobacco averaged about 10 percent of the total. In many of the war-torn countries, particularly Germany, Austria, and China, supplies of tobacco products represent only a fraction of prewar amounts. In the American and British zones of Germany, the annual supply of tobacco available to consumers since the war has averaged only about 0.7 pounds per capita as compared with 4.5 pounds in 1938. Much of the limited supply of tobacco products finds its way into the black market, where prices are out of reach of the average consumer. The black-market value of American cigarettes has ranged from 75 to 150 reichmarks per package. In comparison the official price to German farmers for a ton of wheat is 200 reichmarks.

If western European countries and China are to obtain sufficient supplies of United States tobacco in 1948–49 to meet their minimum requirements, large quantities of leaf will need to be provided under the Foreign Assistance Act. This, together with sales to the countries participating in the program, and sales to other countries, should result in a total 1948–49 export of at least 500 million pounds (export weight), as compared with approximately 400 million pounds in 1947–48. An export of 500 million pounds is about 100 million pounds or more short of what is believed to be the current potential export demand for United States tobacco.

World Preference for United States Tobacco

Practically all of the important tobacco-importing countries of the world have a preference for United States grown tobacco. During the war, the distribution abroad of American-type cigarettes and other products containing American leaf increased this preference. A trend to American tobacco was also accelerated by decreased production of leaf in war-torn countries, particularly the Netherlands East Indies. The preference is reflected in the large 1946 United States exports and the maintenance of high exports in 1947 in the face of shortage in dollar exchange available to importing countries. In 1946 the 14 western European countries, including Spain and the western zones in Germany, obtained about 69 percent of their import requirements of leaf from the United States, as compared with 43 percent in the prewar years 1935–39. Despite the dollar shortage, 55 percent of their 1947 imports were from the United States. Manufacturers in those countries report that if they can obtain adequate dollar exchange and are permitted to make their own selection of leaf approximately 62 percent of their imports for the next few years will be from this country.

The required larger proportion of United States leaf in western Europe results from continued strong demand for cigarettes made exclusively from American flue-cured tobacco, particularly in the United Kingdom and Ireland; from increased demand on the Continent for blended-type cigarettes containing American leaf; and from the demand for more American leaf in pipe tobaccos.

Consumption of cigarettes has increased at the expense of other tobacco products and straight oriental-type cigarettes have lost ground to blended types. In 1938 cigarettes consumed in the 14 countries, including the western zones of Germany, were comprised of about 24 percent straight oriental cigarettes, 47 percent straight flue-cured, and 29 percent blended types. Manufacturers in the countries now report the demand for straight oriental-type cigarettes at only 8 percent of the total; straight flue-cured at 40 percent; and blended types 52 percent. Trends to blended-type cigarettes containing American leaf are reported for many countries outside of Europe. The demand for straight flue-cured types in China and other countries accustomed to them has also continued.

Our Tobacco-Production Capacity

As was demonstrated in 1946 and 1947, American tobacco farmers can produce sufficient leaf to provide for domestic consumption and for the potential export demand. The country's ability to maintain exports at the high potential level, however, will depend on its being able to meet price competition with leaf from competitive sources and to adjust its balance of payments with tobacco-importing countries so they can obtain dollar exchange to pay for imports.

High prices for United States leaf and shortage in dollars lead importing countries to purchase in other areas and to encourage their own production of tobacco. Some examples of this are already at hand. As a result of shortage in dollars the United Kingdom and other tobacco-importing countries of Europe are encouraging the importation of maximum quantities of leaf from countries which will accept their currencies. Italy and other tobacco-producing countries in Europe and Asia are finding it advisable to increase domestic production. Perhaps the use of dollars for the purchase of tobacco under the Economic Assistance Act will enable importing countries to continue their takings from the United States during the next few years. There is no assurance, however, that European countries can continue after the next few years to purchase their maximum requirements of United States leaf. This will probably depend upon whether the United States increases its imports and thereby provides dollar exchange for importing countries to continue to obtain tobacco and other items from this country.

FATS AND OILS

The critical world shortage in fats and oils has been eased to some extent. Better transportation facilities, partial recovery in world trade, and significant increases in production in some areas have been the main causes of the improvement. Fats and oils for both food and industrial uses, particularly in many European countries, are still well below the prewar level, and developments in 1947 and the first half of 1948 did not point to a speedy recovery. Production in 1947 and 1948 was slightly below the 21.6 million short tons of fats and oils of all types available before the war for world use. Lower production in some areas, increased consumption in others, and various political difficulties restricted international commerce in these products to about 3.7 million short tons in 1948 compared with the prewar average of 6.5 million tons.

European countries in 1947 and 1948 received not more than two-thirds of their prewar imports. This reduction, along with a sharp cut in their domestic production of animal fats, forced many European countries, notably Germany, Austria, and France, to continue the rationing of fats and oils at far below the prewar consumption. Supplies have been critically below desirable levels in France, despite efforts to increase domestic production and to restore imports from French colonies. The United Kingdom, the Netherlands, and Belgium have access to extensive vegetable-oil resources in their colonial territories. Norway, with a predominant interest in Antarctic whaling, is able to export oil. Continued high production in the United States has helped to maintain fat consumption here at a level only slightly below the prewar.

Supplies from former exporting countries such as Manchuria, India, and the Netherlands Indies are at a low level. In consequence, the quantities available to many countries are small. Wide fluctuations in the prices of oils and oil-bearing materials available for export occurred during the past year in the few markets that permitted competitive buying. Comparative stability in prices is not likely until the world supply is larger and more readily available.

Postwar production and trade in fats and oils differs significantly from the prewar pattern. Causes of the change include the normal increase in population in some exporting areas, the development of industry in areas formerly not industrialized, greater commercialization in the production and distribution of fats and oils, and new consumption habits. In combination these factors considerably increase local consumption and reduce the supply available for export. Such developments have been notable in South America, India, and China, and have indicated a need for new world sources of supply. Many countries formerly dependent heavily on imports of fats and oils are increasing their own production. Among exporting areas Africa is noteworthy for spectacular efforts to increase peanut production and to extend and develop oil-palm resources. Such efforts cannot immediately relieve the situation but have important implications for the future.

The United States met the wartime fat problem by increasing its area of soybeans, peanuts, and flaxseed; by increasing its output of animal fats; and by restricting its consumption. As a result, during the war period, it became a net exporter of fats and oils. With supplies of coconut oil and palm oil again available on the world market, the United States continues to export edible oils and fats, but imports an equal or greater quantity of other oils. Much of the United States surplus edible fats and oilseeds will go to Europe although Latin America continues to be an important outlet for such supplies. Our dependence on imported castor oil, palm oil, and cononut oil will continue, alleviated by domestic programs only to the extent that such programs may facilitate an exchange of our oils for oils of other types needed from foreign sources.

The Immediate Outlook

Temporarily, Europe will require all the edible fats and oils that we can spare. Among the dependable Asiatic sources, only the Philippines has produced oil in prewar volume. Exports of copra from the Philippines in 1947 were an all-time record. Severe typhoons in December 1947, however, reduced the available Philippine supplies for 1948. The Netherlands Indies has just begun to recover from wartime damage; its exports are only a fraction of the prewar volume. Formerly the most important sources of palm oil, the Netherlands Indies in 1948 will make only small shipments. The plantations of Sumatra, brought again under Netherlands control late in 1947, are increasing their output, but the restoration of prewar production will take some years. Supplies from China and Manchuria continue to be restricted by political disturbances.

High prices have stimulated the production but also restricted the consumption of fats and oils for both industrial and food uses. As world supplies increase in proportion to requirements, high-cost production areas will have harder going. Nevertheless, there is no early likelihood of abundant supplies and low prices such as prevailed during the 1930's.

SUGAR

The 1947–48 fiscal year witnessed a rapid transition from shortage to abundance of sugar supplies in the United States. With this change in the supply picture, it was possible to abandon rationing and price controls. Household rationing was discontinued on June 12, 1947, and industrial sugar rationing was abolished July 28, 1947. In accordance with the provisions of the Sugar Control Extension Act, price ceilings continued in effect until October 31, 1947. Finally, on January 1, 1948, marketing and import control were reinstated under the newly enacted Sugar Act of 1948.

To continue the principal provisions of the Sugar Act of 1937, which expired on December 31, 1947, the Sugar Act of 1948 was passed by Congress and approved by the President on August 8, 1947. The new act continues the basic controls which have been in effect since the enactment of the Jones-Costigan Act of 1934. These include provisions for marketing and import quotas based on estimates of total United States sugar needs, the quotas being applicable to both domestic and foreign sources of supply. Whereas the 1937 act provided for quotas in terms of specific percentages of our total needs, the new act gives each of the five domestic areas and the Republic of the Philippines fixed quantitative quotas.

Cuba, as our principal foreign source of supply, in effect, is permitted to supply the great bulk of the quantity by which domestic requirements exceed the sum of the fixed-quantitative quotas. Furthermore, in recognition of Cuba's wartime efforts in supplying our market during the period of critical sugar shortage, that nation is given the bulk of any amount by which the Republic of the Philippines is unable to meet its quota, plus a pro rata share of the amount by which any domestic area fails to fill its quota. Cuba cannot receive a lower quota under the Sugar Act of 1948 than it would have received under the previous act.

Because of increased supplies and the gradual release of wartime rationing and price controls, the price of sugar was prevented from reaching the inflationary levels which prevailed at the close of the First World War. On October 31, when price control expired, the wholesale cane basis price for refined sugar was $8.40 per 100 pounds. Following the period of price control, sugar remained substantially at the level of the old ceiling price until early in 1948, when it declined to $7.50 per 100 pounds. Later, the price recovered to its present level of $7.75 per 100 pounds.

General Directive Continued

To insure that the interest of both consumers and domestic producers are fully safeguarded, the general directive included in previous sugar legislation is continued in the present act. This is the mandate which sets forth that adequate supplies of sugar shall be made available to consumers at reasonable prices, while on the other hand, the domestic sugar industry shall be protected and maintained.

A principal difference between the present sugar act and the previous legislation is the method by which the Secretary is required to determine the amount of sugar needed in continental United States. Section 201 of the present act sets forth in detail certain bases and considerations, including the amount of direct-consumption sugar distributed in the previous year ended October 31, deficiencies or surpluses in inventories, change in population, demand conditions, and the level and trend of purchasing power. In addition, consideration must be given to the relationship between sugar prices and the general cost of living.

The fiscal year also saw an end of the wartime programs of Commodity Credit Corporation, which had been designed to stimulate sugar production and to assure maximum supplies for United States and allied consumers during the period of critical shortage. The 1947 crop of sugar beets was the last one for which a support program was effective, and the 1947 Cuban sugar and molasses crop was the final major crop procurement.

While crop purchases for United States needs were no longer undertaken, Commodity Credit Corporation continued to purchase the sugar requirements of the Department of the Army in the feeding of the civilian populations of occupied Germany, Japan, and Korea. Inasmuch as sugar was in comparative abundance, while other foods, notably the grains, continued in short supply, Commodity Credit Corporation purchased 1,238,000 tons of 1948 crop Cuban sugar, 38,000 tons of Peruvian sugar, and 17,000 tons of Javan sugar.

World Sugar Supplies Increased

World sugar supplies increased sharply during the fiscal year, although they were still somewhat below prewar levels. Offsetting the fact that world supplies were below prewar levels was the comparatively restricted effective demand in terms of hard currencies. Purchases for Army requirements in the occupied areas, together with the program of the Marshall Plan in supplying dollars to the nations of Western Europe, made it possible for world supplies of sugar to be marketed which might otherwise have developed into burdensome surpluses.

Through its administration of the Sugar Act, the Department continues its efforts to make certain that adequate supplies of sugar are available to consumers at reasonable prices while at the same time that protection is fully afforded to the domestic sugar industry.

With Cuba producing at a rate more than double its prewar production and with production recovering in other foreign countries, especially the Philippines, Formosa, and Java, coordinated action may be necessary to avoid serious surpluses and to obtain maximum world consumption. The International Sugar Council continues as an instrumentality whereby sugar-deficit and sugar-supplying nations can effect agreements which will assure adequate world supplies without the development of burdensome surpluses.

RAPID FARM MECHANIZATION CONTINUES

Farms now are being mechanized more rapidly than in any other period in our history. Especially significant is the development of tractors and of labor-saving equipment adaptable for use on the smaller farms. A generation from now there may be at least 5 million field tractors plus several hundred thousand garden tractors on farms. This compares with a total of more than 3 million tractors of all kinds on farms at present. During the same period horse and mule numbers will be reduced from their present level of 9 million to less than 4 million. Rapid farm mechanization is expected in the Southern States.

Increased mechanization was directly responsible for more than 10 percent of the increase in the volume of the farm output during the last decade. It is estimated that the increase in mechanization during the war accounted for 30 percent of the rise in production per man-hour of farm labor. Increased yields of crops about equalled mechanization as a labor saver per unit of production during this period. Tractors and other motor vehicles rapidly displaced farm horses and mules. As a result, about 15 million acres of cropland were released from the production of feed for work animals to the production of products for human use. In addition, increased mechanization contributed to a rise in crop yields, in part because it facilitated greater timeliness in crop operation.

Farmers in the United States are now using twice as many tractors as they did in 1940. There has been an increase of 80 percent in the number of trucks on farms, of about 20 percent in automobiles, of about 150 percent in grain combines, of more than 100 percent in mechanical corn pickers, and of more than 150 percent in milking machines. During this same period the number of horses and mules on farms has been reduced by more than one-third. The total volume of all farm power, machinery, and equipment (including horses and mules) has increased by about 40 percent.

Noteworthy is the increased use of beet harvesters, pick-up one-man hay balers, forage-field choppers, manure loaders, self-propelled combines, corn pickers, and cotton pickers which has gone hand in hand with improvements in these machines and in tractors. The number of electrified farms is three times the number electrified a decade ago.

The total value of tractors, trucks, and automobiles, and other machinery owned by United States farmers was about 7 billion dollars on January 1, 1947. The value of their investment in machinery may now be as high as 8 billion. The 1935–39 average investment was 2.6 billions. Farmers' cash expenditures for machinery replacements and additions totaled more than 1.5 billion dollars in 1946. This was more than twice the average dollar expenditure for such purposes in 1935–39. But both the increase in value of the farm-machinery investment and the rise in annual dollar purchases of machinery by farmers partly reflected a rise in prices. Farm-machinery prices have risen more than one-third over those of the prewar period 1935–39.

In 1947 the United States exported about one-sixth of its total farm-machinery production (including industrial tractors). The export volume of farm machinery in 1947 was 3.7 times that of 1935–39. About 12 percent of the 1935–39 production was exported.

Machinery and Larger Farms

The increased use of tractor power has accompanied the trend toward larger farm units. For example, in an investigation reported by the South Carolina Experiment Station only 11 of the 39 small farms studied had in 1946 dispensed with the use of mules; others, however, were convinced that they could farm more efficiently without them. On the farms using both mule and tractor power, mule-power costs per hour were higher because of the relatively small amount of work done.

Agriculture is in a stage of rapid transition to machine techniques. The Oklahoma Experiment Station, in a study of farm mechanization based on agricultural census data to determine its effect upon the organization and demand for farm labor, showed that farm mechanization in this State from 1920 to 1945 has been associated with a decrease in the total farm population, especially among low-income families, a reduction in farm individuals under 25 years of age, a decrease in birth rates, a reduction in demand for hired labor, and a decrease in the amounts of off-farm work and part-time farming, but without selectivity in the reduction of farm operators by races. Although a high proportion of owner-operated farms still exists, there have been slight increases in the proportion of nonresident operators, comparatively slow decreases in farm tenancy, and restricted changes in types of tenancy, but no important change in the age composition of farm operators. Other trends include increases in acreage per farm, in the proportion of farms with 500 or more acres and with level topography, a high ratio of cropland to total farm land, a shift to crops adapted to tractor farming, and an increase in livestock other than horses and mules. Increases in gross and net incomes, in the commercialization of farms, and in the capital investment per farm and a high level of living among farm operators' families were also revealed by this study.

HIRED LABOR ON UNITED STATES FARMS

The emergency farm-labor program which the Department carried on during the war years, with its provisions for assisted migration of farm workers and for the importation of workers from other countries, was terminated at the end of 1947 with the reassignment of the farm-labor-placement program to the United States and affiliated State employment services. Some supervised importation of Mexican labor for farm work in the United States has been resumed in 1948 through an agreement negotiated between the two Governments and now administered by the United States Employment Service. The number of imported farm workers to be used in 1948 is likely to be much smaller than in 1947, which in turn, was far below that of 1946 and of 1945. Also, unlike the earlier programs, the 1948 importation is not being done at Government expense in connection with the transport, health, and housing services previously provided, but rather at the expense of employers of such labor. Even in 1947 this country under Federal auspices imported only 40,000 foreign agricultural workers, as compared with 80,000 in 1946, and 120,000 in 1945. The decline was the result of easing produced in the domestic farm-labor situation by demobilization and other causes.

Employment of hired farm workers in the United States in 1947, on an annual average basis, was 5 percent greater than in 1945. Moreover, among family workers on farms there was a considerable increase in able-bodied adults, who largely replaced the women, children, and elderly men recruited for farm work in the war years. These changes in the quantity and composition of the farm-labor supply contributed to some extent to the increase in productivity per farm worker. The average number of workers employed on United States farms was 7 percent below the prewar (1935–39) average; yet the Nation's farm production was 34 percent greater. Machinery and science were of course basic factors in the growth of productivity per farm worker.

Total farm employment in 1947 averaged 10,157,000 persons as compared with 9,844,000 in 1945. Comparable figures for 1948 are not yet available, but when compiled will probably show little change from last year's level. Along with the improvement in the quality of the active farm-labor force have gone further mechanization and further improvement in farm technology in general. In terms of labor's productivity on farms, the comparison with prewar years shows best what has happened. Farm wage rates were up in 1947 about 8 percent from 1946, but rural living costs increased, too. Hence, the real value of farm wages declined, though with a big remaining improvement over prewar levels.

CROP INSURANCE

Every year many farmers throughout the country either lose their crops completely or suffer material damage from varied production hazards over which they have no control. Flood, drought, insects, plant disease, and many other factors all take their toll annually. The immediate objective of the Federal Crop Insurance Corporation of this Department is to develop a sound and workable system of insurance against these hazards. The ultimate objective is to provide producers of all major crops the opportunity to secure protection against loss of their crop investment from these innumerable production risks.

Accomplishment of even the immediate objective may well require many years as it has in other less complex types of insurance. Along this scale of time the past year marked only the ninth year of operations since insurance was first initiated on wheat. Nevertheless, it was one of the most important years since the inception of Federal crop insurance. Of particular note is the fact that it was the first year in which the over-all operation of the Corporation showed a profit. Contrasted with earlier years of operation, this signifies marked progress. Also during the past year amendatory legislation sharply redirected the Corporation's activities by placing emphasis on experimentation instead of Nation-wide operations, and made other changes, including a provision for closer teamwork between the Corporation and private insurance.

Operations Under New Legislation

Under the new legislation, crop insurance was in force for the 1948 crop year in 200 counties for wheat, 53 for cotton, 49 for flax, 38 for corn, 32 for tobacco, and 4 for dry edible beans. The legislation discontinued insurance in about 1,500 counties where it was in force for the prior crop year and terminated 3-year wheat contracts and continuous cotton contracts in such counties. Even so there are approximately one-third as many contracts in force in 1948 as there were in all counties in 1947, which reflects the present policy of insuring a crop in areas where it represents an important part of the total farm income.

The new legislation restricted the coverage to an amount representing not more than the average investment in the crop in the area, whereas previous legislation limited the coverage to 75 percent of the farm average yield. The new restriction results in considerably lower insurance coverage which is believed to be a sounder approach to the insurance of crops.

The insurance contracts covering all commodities are of two general types. Under one type the coverage is expressed in commodity amounts (bushels or pounds) and the insured farmer is eligible for an indemnity if his production is less than the guaranteed amount. The second type is one under which the coverage is expressed in dollars and represents approximately the out-of-pocket cost of producing the crop in the area. Under this contract the insured farmer may claim a loss if the value of his production, calculated on the basis of a predetermined price, is less than his coverage. Most of the 1948 insurance was based on the commodity-coverage contract but under the new legislation greater emphasis was placed on the monetary-coverage contract than in prior years.

In two counties a new comprehensive type of contract was tried for the first time in 1948. This plan is a small experiment initiated with a view of meeting the insurance needs of diversified farming areas where insurance on an individual crop offers inadequate protection because no single crop represents a major source of income. The insurance contract covered four commodities in each of these two counties. Oats, wheat, corn, and flax were insured in one county, while oats, wheat, corn, and dry edible beans were insured in the other.

The amount of coverage (in dollars) for a farmer is the total of the separate coverages for each of the commodities insured. A loss is paid only when the value of the production from all of the insured commodities is less than the total coverage.

The amendatory legislation, in providing for closer teamwork between the Corporation and private insurance, expanded the membership of the board of directors of the Corporation from three to five and provided that two of the members shall be persons experienced in other insurance business. The two new members were appointed in the fiscal year 1948, one of whom is associated with several stock insurance companies and the other with a mutual company.

Underwriting Experience

Underwriting experience for the 1947 crop year is the latest that can be given here. Wheat, flax, cotton, tobacco, and corn were insured in the 1947 crop year and practically all the losses on these contracts were paid by June 30, 1948. All these commodities except tobacco and corn were insured in 1947 on a Nation-wide basis and these two were insured in 19 counties each.

The 1947 crop year premiums amounted to approximately $44,000,000 and losses to about $34,000,000. Premiums exceeded losses on wheat for the third consecutive year and on flax for the second time in the past 3 years. Cotton and tobacco premiums and indemnities approximately balance for the 1947 crop year. For the two prior years the tobacco-premium surplus was substantial but in cotton the losses materially exceeded the premiums. For corn the 1947 crop year losses exceeded premiums by slightly more than 2 to 1. These losses were due primarily to a late, cool, wet spring throughout the important corn-producing areas, followed by a midsummer heat wave in the Mississippi Valley area. This adverse weather resulted in the smallest corn crop since the drought year of 1936, and heavy insurance losses are expected under such conditions.

The new program, while restricted more than previously, is not only sounder, but it also provides an opportunity to give more attention and supervision to its development than in past years. As experience is incorporated, this program can be gradually and safely expanded. Although at the present time crop insurance is available only to a small proportion of the farmers, it ultimately should be an important factor to all of agriculture. The principle of insurance of crops is sound, and this protection against crop losses should form a part of the national program for agriculture.

POSTWAR GAIN IN FARM POPULATION STOPS

The postwar increase in the United States farm population stopped in 1947. Joint estimates by the Bureau of Agricultural Economics and the Bureau of the Census show that in January of this year about 27,439,000 people were living on farms, about the same number as a year earlier, 2,249,000 more than the war-time low of 1945 but about a tenth fewer than in April 1940, when the last population census was taken.

Although the total number of people on farms varied little during 1947, important changes took place. Three-quarters of a million babies were born to farm families—the largest annual natural increase since 1925—while deaths totaled 2267,000. Nearly a million persons were estimated to have moved to farms during the year, while more than a million and a half moved away.

The gain in population since 1945 has been largely due to the high birth rate in recent years and to demobilization. In 1945, many ex-farmers were in the armed services or working in war plants.

The bulk of the decline in farm population from 1940 to 1947 was accounted for by youths under 25 years of age. Older age groups numbered about the same despite substantial increases in these groups in the total population.

Considerably more farm residents were employed in nonagricultural industries in 1947 than in 1940. This largely resulted from greater opportunities for nonfarm work during and after the war and to the displacement of farm labor by machines. In addition, many workers in cities and towns are now living on farms and commuting to work because of the housing shortage.

In 1940, one out of every five employed persons living on farms was engaged in a nonagricultural occupation, but in 1947 this was true for one out of every three.

FARM LAND VALUES CONTINUE UPWARD

The farm real estate market continued to reflect higher levels of agricultural prices, farm incomes, and net land earnings. Land values reached a new record high. On July 1, 1948, such values for the country as a whole were 109 percent above the 1935–39 average, 74 percent above the 1912–14 average, and 2 percent above the boom level of 1920.

In the year ended July 1, 1948, farm land values increased by 7 percent. This was a rate of increase slightly over one-half that of each of the preceding 6 years, when values rose about 1 percent a month. The largest general increases were in the wheat and range-livestock areas, where cash returns were exceptionally high. Values were up about one-eighth on the average in the West North Central and West South Central geographic divisions, and were strong in some of the adjoining Mountain States where wheat and range livestock are major enterprises.

Increases of one-tenth or more were reported for West Virginia, South Carolina, and Georgia. In the South Atlantic division the average was held down by steady markets in Delaware, Maryland, and Virginia, and by declining values in Florida. The market was generally strong in the East North Central division, but Wisconsin was the only State in this group where values increased more than 10 percent. Increases averaged about 5 percent in the New England and Middle Atlantic divisions; no State in either of these groups reported increases of as much as 10 percent. For the Pacific division, a decline in California more than offset slight increases in Oregon and Washington.

Comparison With Boom After World War I

Land values on July 1, 1948, exceeded the boom level of 1920 in 35 States—in some instances by nearly 50 percent. The only large group of States where land values were still below their 1920 peak was the group centered in the Corn Belt and Northern Great Plains, one of the areas that had extreme inflation in the World War I boom and extreme declines in the ensuing depression years. The current inflation has apparently been greatest in areas affected by industrial developments. Farm land values are now furthest above 1920 levels in North Carolina, Kentucky, Tennessee, Alabama, California, New Mexico, Michigan, Rhode Island, Connecticut, and New Jersey—all of which have had much growth recently in nonfarm enterprises.

Farm transfers were about 15 percent less numerous than the record high of the preceding year and were lower than in any other year since 1942. Voluntary sales and trades for the United States as a whole comprised an estimated 49 per 1,000 of all farms, as compared with 57.7 for the previous year. Despite this sharp decline, the volume of sales was about two-thirds higher than in 1935–39 and for the fifth consecutive year exceeded the sales in 1919, the peak year of the World War I period.

The net movement of land continued to be in the hands of active farmers. Farmers bought about two-thirds of the land transferred and sold about one-half. Roughly one-half of the farmer buyers were owner-operators buying additional land.

There was little change during the year in the method of financing farm transfers. Slightly more than one-half of the recorded transfers (excluding purchase contracts) were for cash, and the down payments in mortgage-financed transfers averaged about two-fifths of the purchase price. Individual and commercial banks continued to supply about three-fourths of the mortgage credit used to finance farm purchases. Reports from several areas indicated that credit was not as readily available as in earlier years and that interest rates had increased slightly.

Reflection of Prices and Demand

Strength in farm-land prices and in the demand for farm land reflected strong demand for agricultural commodities and further increases in farm incomes. High commodity prices, favorable parity-price relationships, and near-record farm production lifted net farm earnings to a new record high in 1947 for the sixth consecutive year. Net land rents, the principal indicator of land earnings, in 1947 were one-fifth higher than in 1946, two-fifths higher than in 1945, and almost four times as high as in 1935–39. Thus, despite the doubling of land values, the rate of current returns on investments in land was 75 to 80 percent higher in 1947 than in 1935–39.

The slower rate of advance for farm land values in 1947 than in preceding World War II years resulted from a number of factors, among them the reappearance of surpluses of some farm products such as in citrus fruit and potatoes. Another influence was the expectation that export demands might fall short of the early calculations. Prospects for another year of heavy crop production were important. Perhaps the most important general factor was a sharp rise in farm production expenses. These advanced more than 2.5 billion dollars in 1947—to a level nearly three times as high as in 1935–39. Prospective land buyers sensed the danger of being caught in a squeeze between high fixed costs and declining levels of agricultural prices and farm incomes, as many were after World War I. The result was a healthy growth of caution.

CONSERVATION OF SOIL AND OTHER RESOURCES

The Department favors multipurpose development of the natural resources of an area or region. It participates for this purpose in the work of the Federal Inter-Agency River Basin Committee, of the Missouri River Basin Committee, and of the Columbia River Basin Inter-Agency Committee. These committees help to correlate the programs of the several Federal departments. In the Missouri Basin the committee, which consists of the Governors of the Missouri Basin States and representatives of the Federal agencies, has detailed plans for the comprehensive development of both land and water resources. A 6-year (1949–54) program covering the activities of all the participating agencies calls for an acceleration of regular agricultural activities by various Federal and State agencies to bring them into line with the stream engineering by the Bureau of Reclamation and the Corps of Engineers.

Emphasis given this year to long-range agricultural policy included recognition of the need for accelerated conservation. This Department reached some general conclusions and offered some specific recommendations. Conservation of agricultural resources, the Department declared, is an integral part of agriculture as a whole and cannot be treated as a separate problem. Conservation emphasizes long-run needs such as depend for their fulfillment partly on day-to-day farming operations. The farmer has only one farm operation in which he must take care of his financial needs and at the same time do what he can to conserve soil and water. He cannot have two operations, one for production and one for conservation. If he does not achieve reasonable financial success, he cannot carry out many needed conservation measures. Ultimately, the Nation's interest in the food supply coincides with the farmer's interest in profitable production currently combined with protection of the resources required for ample profitable production in the future. Naturally, this gives the Nation and the agricultural industry a joint interest in the costs of conservation, from the standpoint both of immediate and of long-time benefits to farmers and to the public.

Many Elements in Program

Governmental programs in support of this farm operation must recognize varied demands upon the farmer. They must coordinate research, education, and financial assistance in the never-ending task of establishing goals adjusted properly for production combined with conservation. All parts of the program must harmonize. Specifically, the conservation work must recognize the need for production and also the need for adequate farm incomes. Skillful farmers combine all the knowledge, machinery, and other resources they possess in their operations for production and maintenance of their farms. In like manner this Department and the cooperating public agencies must organize and integrate public programs and facilities for conservation work.

The Department's activities that contribute to land conservation are numerous. In fact, the Department's central aim, that of helping to establish a permanent, stable and prosperous agriculture capable of producing necessary crops and livestock efficiently, presupposes conservation of basic agricultural resources. Moreover, this objective cannot be sacrificed to other objectives. For example, efforts to maintain farm incomes at an equitable level would fail completely if they neglected conservation. On that basis future production would be sacrificed for current gain.

Farmers have a right to incomes fair in respect to the incomes of other segments of the national economy. They should have improved farm living through the extension of rural facilities and services; adequate credit facilities; research in their behalf, along with experimentation in and demonstration of better methods and practices; also, increased efficiency in the marketing and utilization of farm commodities. But each of these objectives depends for its realization on the extent to which, in combination with the other programs, effort toward it preserves and builds agriculture's physical basis. With soils impoverished and imperilled, the country would not long be able to sustain a prosperous agricultural community.

Physical and Economic Criteria Combined

Our many-sided agricultural program involves price supports, production adjustments from time to time, crop insurance, credit facilities, scientific research, and educational extension. It helps farmers so that farmers may help the Nation to get sufficient food and fiber for all necessary purposes. Fulfillment of this program necessitates broad administrative machinery, operated partly by committees made up largely of farmers elected in a democratic system that has worked out well. The test of results is physical as well as economic and social; it covers agriculture's resources, as well as its earnings and living standards.

In other words, the test is the power of agriculture not merely to produce but to keep on producing. Agriculture's land, water, grass, and trees must be an increasing, not a declining capital. Otherwise, despite all other apparently favorable signs, the agricultural program is not succeeding. Conservation and improvement of resources are basic to agricultural and national welfare, and all agricultural programs should promote or at least not hinder them. It may not always be possible to obey this rule, as we discovered in the war years. But in that event we shall have arrears to make up.

Changes are necessary from time to time in the conservation program such as may affect the agricultural program as a whole. Soil and water programs of the Department do not consist of the activities merely of a one Department agency, but represent the coordinated effort of many agencies, focussed together on problems of saving and improving resources. Hence, significant change in one activity may entail change in all the others. Farmers must have many kinds of help—not merely technical advice, but aids to cooperative action among themselves and with Federal, State, and county agencies. The combination affects the agricultural program as a whole and in all its parts. Chief ingredients for conservation are:

1. Research.
2. Education of all the people—rural and urban.
3. Technical assistance to individual farmers and ranchers.
4. Incentives, in the form of materials, services, and payments.
5. Local leadership and locally formulated programs.
6. Marketing quotas and production-adjustment programs.
7. Managing, conserving, and utilizing federally owned land.
8. Watershed-treatment programs in aid of flood control.

Tasks for Various USDA Agencies

Some of the Department's agencies carry major responsibilities in the conservation field. Technical assistance to land users is primarily a responsibility of the Soil Conservation Service, which offers this help largely through soil conservation districts established under State laws. On request the Soil Conservation Service aids individual farmers and ranchers in these districts. It helps them to prepare basic conservation plans which reckon with the needs and capabilities of each acre; consider the soils, the water supply, and the slopes; appraise the physical condition of the entire farm unit; and help to deal with the economic problems of the operator. Nearly 2,000 soil-conservation districts are in operation. These comprise more than 1 billion acres within the United States and a considerable area in the Territories and Possessions. Conservation plans have been completed for 600,000 farms, aggregating more than 167,500,000 acres. Besides furnishing technical help the SCS investigates technical problems. Also it manages submarginal lands acquired by the Federal Government under the Bankhead-Jones Farm Tenant Act; and provides agricultural planning and other services for settlement activities on Federal irrigation projects authorized by the Case-Wheeler Act of 1939. It cooperates with the Forest Service in flood-control work under various flood-control acts.

Most farmers require more than technical aid in carrying out conservation measures. They get such additional help through the agricultural conservation program, administered by the Production and Marketing Administration. The ACP offers special incentives, either in cash payments, or in materials or services. Through it the public and farmers cooperate in practices that produce large public benefits. In each State the program is administered by a committee composed of farmers appointed by the Secretary of Agriculture, with the State director of extension as member ex officio, and in each county and community by local committees elected by the farmers. Programs for each year develop from recommendations drawn up by these State and county committees from an approved national list of conservation practices.

Aided by a technical committee composed of agronomists, foresters, agricultural engineers, representatives of the experiment stations, Extension Service, and Soil Conservation Service, and others, each State committee selects and prepares local specifications for the practices it considers generally most necessary for its State. Each county committee formulates a list of practices deemed appropriate in its county. Community committees work with individual farmers. Through ACP in 1947 the Department encouraged conservation practices on farms and ranches that embraced almost 60 percent of the Nation's cropland.

Encouraged and assisted by the Agricultural Conservation Program, operators of these farms and ranches seeded more than 1½ million acres of permanent pasture; limed more than 14 million acres of land; supplied phosphate and potash to nearly 30 million acres; placed 95 million acres under grazing management; raised green-manure and cover crops on nearly 19 million acres. All this work was under the supervision of the above-mentioned State and county ACP committees, which also helped to administer many of the Department's other activities such as the programs for price support, crop insurance, production adjustment, marketing quotas, and commodity loans.

Education in conservation is largely a duty of the Cooperative Extension Service, through which Federal and State agencies pool their teaching. The research on which this teaching depends is also largely a joint Federal-State task, carefully coordinated to prevent overlapping and promote mutual aid. Because of the nature of these jobs, research and education require administrative procedures very different from those used in the Federal action programs, notably a high degree of dependence on State agricultural agencies. This education and the supporting research have dealt in recent years with the subject matter of broad agricultural problems as well as with strictly technical questions. It has been found imperative thus to broaden the approach.

The Extension Service in this Department performs several functions with important implications for conservation. It makes Federal reasearch results available to the States; maintains administrative contact with State extension services; works with the States in coordinating and developing programs; serves as an educational channel to bring farmers information about various Federal programs. But the Extension Service and the affiliated State agencies do not accomplish the entire educational task, though they are the general educational agency for implementing the broad agricultural program. Certain phases of education are of a necessity a functional part of the action programs.

Conservation of Forest Lands

Conservation of forest lands is a prime requirement. This is largely the responsibility of the Forest Service. Forested land requires protection from fire, and the Nation has established a far-flung Federal-

State system of fire protection, which helps to preserve the forest cover on some 303 million acres of land—much of it steep and highly erodible. The Forest Service provides technical assistance to operators of private farm and nonfarm forest lands. These important soil-conserving activities on forest lands link up with the activities of the Soil Conservation Service, the agricultural conservation program, and Extension Service, and other Department agencies and activities with direct or indirect responsibilities for conservation.

Action directed by Congress to insure adequate farm incomes is a vital part of the conservation program. Low farm incomes would force many farmers to abandon conservation practices. Excessive erosion would follow, with probable loss of all the gains achieved by previous conservation effort. Production goals, price supports, and other devices for stabilizing incomes help to prevent mistreatment of the land. Hence they are truly soil-conserving measures. Such efforts exemplify the interdependent character of conservation—aids provided by different departmental agencies.

During the congressional hearings on long-time farm legislation, the Department of Agriculture recommended five kinds of action to strengthen conservation programs:

1. Establishment of USDA farmer-elected county committees.
2. Consolidated housing of agricultural agencies in each county.
3. Establishment of USDA State committees.
4. Consolidation of the Soil Conservation Service activities with agricultural conservation program activities.
5. Provision for an Assistant Secretary of Agriculture with national responsibility with respect to State and county USDA committees.

Consolidation of Program Activities

Consolidation of the Soil Conservation Service program activities and the Agricultural Conservation Program activities into one conservation program and agency would promote efficiency. The delineation of major phases of the work and organization into separate agency functions has been found desirable. Careful study indicates, however, that SCS and ACP activities can and should be consolidated. Neither agency should "take over" the other, but the two should become an entirely new agency within the Department. This will favor perspective, balance, and scope in the unified program. These two agencies have the same broad objective; their different approaches are both necessary. Properly integrated, the two approaches should hasten the preparation and the achievement of conservation plans and improve the results.

The Senate and House Agricultural Committees have had under consideration in connection with their studies of long-range agricultural policies and programs a number of proposals affecting the conservation programs. The Department has found itself in substantial agreement with the broad objectives of most of these proposals.

The county USDA committees which the Department proposes would be elected by the farmers for the particular purpose of perform-ing definite functions in the Department of Agriculture programs and thereby would become an integral part of the Federal Government's administrative machinery for that purpose. They would be subject to provisions of law laid down by the Congress and to regulations of the Department under these provisions of law. They would be representatives of the Federal Government, responsible to the farmers who would elect them for adaptation of the Federal programs to local requirements and conditions within the framework of law which would safeguard essential national objectives.

PLANNING FOR THE MISSOURI RIVER BASIN

Nine agencies of the Department of Agriculture and the agricultural and forestry agencies of 10 States are pooling knowledge and technical resources to prepare a comprehensive agricultural plan for the Missouri River Basin.

This plan will integrate the activities of all of these agencies into a unified program to develop, utilize, and conserve the agricultural resources of the basin. The purpose of the program is to conserve and improve soil; build up and protect forest resources; protect, enhance and develop water resources; enlarge and improve the farm plant through irrigation and drainage; reduce flood and sediment damages; enhance recreation; and help to protect and restore fish and other wildlife.

In particular, the cooperative endeavor will constitute an agricultural counterpart of the monumental "Pick-Sloan" engineering program, authorized by Congress in 1944. The Pick-Sloan program provides for the control of floods on the lower Missouri and its major tributaries, navigation on the main stem, development of Federal irrigation projects, and the generation of water power. Thus, it is a multiple-purpose plan insofar as the water resource is concerned. But water and land are inseparable. As work under the Pick-Sloan plan has progressed, this has become increasingly evident, and a demand for a companion agricultural program has swept the basin. On January 21, 1948, the assembled Governors of the Missouri Basin States called by formal resolution for acceleration of agricultural programs to match engineering programs.

Thus, the immediate reason for preparing a unified agricultural plan for the Missouri Basin is the fact that the Pick-Sloan plan is being put into effect. But other and more fundamental forces are involved. The demand for a truly comprehensive program for the Missouri Basin is a manifestation of an important modern concept. Great undeveloped, or underdeveloped, river basins of the United States can be put to full and efficient use through comprehensive and unified programs of resource development, utilization, and conservation. This concept has gained widespread public acceptance and it seems destined to dominate the programs of the future. The Pick-Sloan plan, the unified agricultural planning effort, the Missouri Basin Inter-Agency Committee, and similar bodies in other regions, are the result of attempts to meet the need and demand for regional programs that measure up to the new concept.

Although the need for unified agricultural plans for entire river basins has been recognized for some time, the Missouri Basin planning effort is largely without precedent. Hence it must produce not only a plan but techniques and procedures for the creation of such regional plans. To take advantage of the knowledge and resources of all agencies able to contribute, the Missouri Basin plan is being prepared by a working group composed of representatives of all Federal and State agencies concerned with farms, ranges, and forests. This group has analyzed the basin's agricultural and forest needs and assigned major planning tasks to participating agencies. This procedure makes full use of existing agencies and obviates any need to establish a new organization.

The plan will encompass a program to conserve and improve the soil, to reduce erosion and run-off, to protect, improve, and enlarge the use of forests and ranges, to adjust land uses, to stabilize dry-land agriculture, to provide shelterbelts, and otherwise to make the most of the farms, ranges, and forests. It will include flood- and sediment-control measures to protect and complement the immense and costly reservoirs being installed under the Pick-Sloan plan; also, programs for irrigation and drainage; for soil surveys, particularly the surveys necessitated by irrigation projects under the Pick-Sloan plan; for intensified research in support of the accelerated basin activities; for education in support of the unified agricultural program and related Pick-Sloan activities; for supporting credit services; and for rural electrification.

Periodical review and revision will keep the plan responsive to changing needs.

MARKETING SERVICES

The producers of our agricultural food and fiber products, the transportation companies, the warehouse operators, wholesalers, jobbers, retailers, and consumers have come to regard certain functions of the Department of Agriculture as essential services. Among these are the market news, grading, inspection, and regulatory activities of the Production and Marketing Administration.

These marketing services have become an integral part of the business of farming. However, the Department strives continually to improve them. During the past year the outstanding development in the Department's marketing services has been the increased application of research to make the marketing services even better. The research is being carried on under the Research and Marketing Act of 1946. Projects are under way to determine ways to increase the effectiveness of market news, grading, inspection, and other services. One project provides for study of market areas to determine what facilities are needed for a new or improved market.

The Department's market-news service did not expand during World War II, but the removal of price ceilings brought an unprecedented demand for market news. Farmers looked upon marketing as their biggest problem of the immediate future. To help meet this problem, farmers have asked the Department for more information on supplies, demand, and prices in terminal markets and producing areas, and they want the information earlier than they get it now. The research projects are designed to determine how these needs for market news can be met.

Some of the specific features of market news that are being studied include standardization of terminology, more effective presentation, coverage of local markets, extending market news to other commodities, and coverage of farm products moving by truck.

As a service to consumers, research in retail market news is being undertaken. Retail markets have been reported by State and City governments for many years, but only in a few cities. Information about these services will provide a basis in perfecting techniques for retail market news reporting on a Federal or Federal-State basis. A pilot study is planned which will determine the feasibility and the best methods of collecting daily and weekly prices in retail stores, and the monthly volume of retail sales.

Research is also being applied to the long-established system of grades and standards to determine how well they are meeting market needs, and what factors of quality should be considered as a basis for reviewing the adequacy of present grades and standards.

One phase of this research is being carried on to establish the correlation between the grades of live animals as applied in the market news service by the market reporter and the grade given the dressed carcasses of the same animals by the meat grader. The consistency of the grades applied to live animals and the dressed carcass has never been accurately established. This information provides a basis for determining the accuracy of the application of standards and grades by market reporters and meat graders.

One of the Department's marketing services which is growing in importance is the technical assistance which is available to cities and communities in planning and building wholesale food markets.

Problem of Out-of-Date Facilities

So far, the Department has concentrated its efforts on improving markets for perishable foods, because this type of market is most in need of improvements. In some of the large eastern cities the wholesale produce markets are over a hundred years old, and are still occupying the same site and even the same buildings as when built. These markets are far behind the development of other phases of food distribution. Consequently these poorly designed and inadequate markets restrict the movements of perishable food products and add to the cost of marketing these foods.

An example of the modernization of the wholesale food markets is the construction of an entirely new million-dollar Mississippi Farmers' Central Market dedicated in July 1948 at Jackson, Miss. This market is the first market to be built from specifications supplied by the United States Department of Agriculture. The manner in which this market was planned and built is the same as that being followed in some 25 other cities and communities where markets are in various stages of modernization.

The first step was a detailed survey of marketing in Jackson and surrounding area. Department personnel interviewed local producers, wholesalers, and buyers to determine the kind and size of market needed. A Department engineer prepared a lay-out of the needed facilities for a selected site. In addition, the Department helped local officials to prepare certain legislation which provided for a market authority to build and operate the market.

The Jackson market was built to provide a much-needed outlet for locally grown produce and to provide Jackson and the surrounding area with a greater variety and better quality perishable foods. The market will also permit distribution of perishable food to Jackson at lower cost and with less waste than before the market was built.

THE RESEARCH AND MARKETING ACT

The year saw the full undertaking of the initial phases of the comprehensive program envisioned by the Research and Marketing Act of 1946. Legislation for this program was enacted in August 1946. An appropriation of $9,000,000 for implementing it became available on July 30, 1947, for the fiscal year 1948.

By its increased emphasis on marketing research and service work and its added support to production research, the act significantly widens research authorities of this Department. Research is a continuous long-time process, but results are appearing already from projects begun under the new act. Annual reports of the agencies that are doing research and the service work under the act give the more important of these results. Administrative phases of the program are covered in the Administrator's report to the Secretary.

First-year operations provided for expanded programs in which the Department, the State experiment stations, the State extension services, State department of agriculture, and other agencies both public and private cooperated. Cooperative efforts developed a coordinated network of projects designed to solve major agricultural problems. This did not mean, of course, that the program tackled all the problems of agriculture. Indeed, this legislation specifically recognized the need for steadily increasing research and service activities and authorized the appropriation of funds in increasing amounts from year to year.

Approximately 200 work projects initiated during the fiscal year 1948 aimed at a limited number of broad objectives.

In the field of marketing, cooperative Federal-State projects included efforts to determine the place of frozen-food locker plants and home-freezer units in the slaughtering, distribution, and consumption of meats; to maintain and expand the market for dairy products; to find better ways of preparing and processing United States produced wools to improve their competitive position with foreign wools; also, to make more complete use of the known superior qualities of cotton.

Other work sought to determine and interpret farmhouse requirements as a basis for adequate economical housing; to obtain data on the nutritional status and dietary needs of various population groups; to collect new plants from foreign sources and determine their possible value; to improve beef and dairy cattle; to combat the diseases and improve the quality and productiveness of poultry; and to study mechanization of cotton production and the ginning of mechanically harvested cotton.

The act gave impetus to research on expanded uses for agricultural commodities. Objectives in this field included efforts to demonstrate the practicability of commercial-scale production of poultry and other animal feeds from vegetable wastes; to increase the use of certain agricultural products as building materials; to convert more of our domestic milk supply to foreign-type cheeses and new products that might be made from skim milk, whey, and other milk byproducts; to develop new industrial uses for wool grease and other wool byproducts; to seek ways of stabilizing the flavor of soybean oil; to determine the value of grain byproducts and the economic advantage of converting surplus and low-grade grains into alcohol for motor fuel; to help farmers get greater benefits from their woodlots by developing new uses for woodlot products; to conduct studies on the prepackaging of fruits and vegetables, both in the production areas and at the terminal markets, as a basis for determining where and when prepackaging should be done.

There is hope that some of these objectives will be realized in time to help agriculture when it again has surpluses. Current high production from American farms gives urgency to the need for improving our distribution system.

The Research and Marketing Act introduces certain innovations in agricultural research administration. One of them is the appointment of a National Advisory Committee representing producers and industry groups.

Appointed in October 1946, this committee at quarterly meetings reviewed the program and offered suggestions for its development. By its advice, the Department established 22 commodity and functional advisory committees as authorized in the act. Each of these committees met several times in the fiscal year 1948 and offered suggestions and recommendations. They brought operating experience and practical business problems to the notice of research groups formed under the legislation to study particular aspects of agricultural production, distribution, and marketing.

Evaluation of this technique must await further experience, but it is evident that producer-industry committees have contributed usefully to the initiation of the work.

The act authorizes the Department to have research and service work performed under contract with public or private agencies, business, or individuals. This authority is being used when the Secretary determines the work can be done in that way more efficiently, faster, and at less cost than it could be done by the Department. The contracting authority has great potential value in that it allows the Department to take advantage of existing specialized facilities and equipment for specific items of research which otherwise would prove too costly. As of June 30, 32 contracts, involving more than $800,000, had been entered into.

NEW DEVELOPMENTS IN AGRICULTURAL MARKETING

Considerable progress is being made by both governmental and private agencies in the development and use of new and improved methods and techniques for marketing agricultural products. Research under the Agricultural Marketing Act of 1946, as well as that supported by other funds by both governmental and private agencies will no doubt contribute greatly to these developments. Increased attention given to the problems of developing improved methods and techniques for marketing and distributing agricultural products when market outlets are adequate to absorb the supplies available at relatively high prices should simplify the problems of handling surpluses in the event they recur.

Some recent examples of improvements in marketing methods and techniques as they relate to specific products may serve to indicate the nature and trend of developments.

Fruits and Vegetables

Prepackaging of fresh fruits and vegetables in consumer-size containers has been adapted to an increasing number of commodities, particularly perishables such as tomatoes, spinach, cauliflower, broccoli, and lettuce. This packaging protects the products and facilitates handling. Increased use of prepackaging for these commodities has been associated with the development and use of consumer grade standards and labeling to facilitate trading.

There have been significant developments recently in the application of refrigeration to fresh fruits and vegetables in transit from shipping areas to terminal markets and in distribution, particularly in retail stores. New refrigerator cars have been built with a type of fan installation which permits better circulation of cool air within the car and, therefore, gives better delivery of perishable loads than the conventional-type refrigerator car. Such fan-type installations are being placed in virtually all new refrigerator cars and in many older cars being rebuilt.

Widespread adaptations of counters have been made for displaying and selling fruits and vegetables in retail stores that provide for refrigeration of this produce, either by ice or by mechanical means. Such refrigeration plays an important part in the merchandising of prepackaged produce and is effective in reducing waste and maintaining the freshness of fresh fruits and vegetables longer than was possible without refrigeration.

A significant increase has occurred in the packaging of frozen foods, particularly sirup-packed fruits and berries in combination metal and fiber containers. This results in straight-line processing methods that closely approximate those used in canning. Such methods reduce hand-labor requirements, and increase the speed of operation; they should reduce handling costs. The packaging of frozen concentrated orange juice for retail sale has been developed. This product when reconstituted with three parts of water to one part of concentrate yields a pure orange juice product very similar in flavor and color to fresh orange juice.

As a means of expanding market outlets, some canners are now blending citrus fruit juice with other fruit juices or are combining orange, grapefruit, and lemon juice in a pleasing blend. In addition the marketing of canned citrus fruit juice through coin-operated dispensing machines has been developed. These and various other methods are used in dispensing the juice so as to make it readily available to consumers in attractive form.

Eggs and Poultry

New developments in marketing methods for eggs relate mainly to grading and packaging. The development of a photographic score for both yolk and albumin factors will aid materially the candling techniques for shell eggs. New inner packing materials for shell-egg cases have been developed and are now being used to give more protection to quality and to reduce breakage. A new method of measuring the performance ability of loaded shell-egg cases and a new export pack for dried egg powder have been developed for improving the handling of eggs and egg products.

Among the new marketing methods developed for poultry products is the preparation of large turkeys in halves, quarters, disjointed pieces, and steaks, and holding these parts at suitable storage temperatures for the convenience of consumers. This method of preparation and merchandising of turkeys has resulted in increased outlets for turkeys by focusing attention on turkey parts suitable for families of various size at all seasons of the year.

Wool

One of the most important recent developments in wool marketing is the introduction and use of core testing for the determination of shrinkage. Heretofore shrinkage, which is one of the principal value determinants in grease wool, has been estimated by visual and manual inspection. Errors of as much as 12 percent plus or minus from the true shrinkage are known to have been indicated, and errors of as much as 4 or 5 percent are not unusual. The core-testing method involves testing a representative sample of grease wool obtained by means of an electrically operated coring device. The cored samples are shipped in moistureproof containers to central testing laboratories where they are analyzed and the shrinkage of the lot calculated. This new method makes possible a reduction in margin of error to less than 2 percent. Wool growers may now be provided with reliable information on shrinkage for use in selling their products.

Improved methods of preparing American wool for market have greatly improved the competitive position of the product. Under normal market conditions the wool clip of the United States meets very severe competition from wools produced in Australasia and South America. One of the principal reasons for this is the superior manner in which foreign wools are prepared for market. The fleeces are fully skirted and the wool is greased prior to marketing. In the United States it has been the custom to remove the fleece from the animal, roll it into bundles, tie the fleece with a string, and then, without giving any attention to grading, pack the wool in bags for sale. The new method of preparing American wool for market follows closely that used for foreign wools and largely eliminates the basis for discrimination against American wool.

Sugar

Two recent developments in sugar marketing methods appear significant. One of these is the marketing of granulated sugar to industrial users in bulk rather than in 100-pound bags. This change results in reduction in costs for labor and for bags and reduces wastage of sugar resulting from adherence to bags. The second development is the sale of sugar to industrial users in liquid rather than in granulated form. This product is simply a sugar solution with from 30 to 35 percent by weight of water and is delivered from refiners to users in tanks and placed in storage tanks in much the same manner as oil is handled. This development reduces handling and storage costs and eliminates the need for reconversion to solution before using.

Dairy Products

A major change in the marketing of milk and its products in recent years has been the increased percentage sold by farmers as whole milk and the reduced percentage sold as farm separated cream. This shift was stimulated by the war and postwar demands for food and by more favorable returns from whole milk relative to returns for cream than before the war.

A new milk pricing formula became effective in the Boston market this year. Prices of fluid milk under this formula vary with the index of department store sales in New England, the index of wholesale prices in the United States, and an index of grain and labor costs in New England. The proponents of this formula emphasized that an index of consumer demand for milk should be a factor in establishing milk prices.

WORLD TRADE AGREEMENTS AFFECTING AGRICULTURE

Our agriculture should benefit from two important international agreements concluded within the last year, (1) a general agreement on tariffs and trade, and (2) a charter for an International Trade Organization. A third proposed agreement—the International Wheat Agreement—did not go into effect. The first of these agreements was signed at Geneva on October 30, 1947; the second at Havana on March 24, 1948.

Signed on behalf of 23 governments and provisionally put into effect by 22 of the signatory nations, the general agreement on tariffs and trade effects an exchange of numerous tariff concessions. This country obtained concessions on many agricultural products, among them fresh and processed fruits and vegetables, grains, rice, tobacco, tobacco products, soybeans, cotton, lard, pork, and other livestock products. Agricultural products on which we made concessions include wool, butter, cattle, grains, and potatoes.

Safeguards modify the concessions. For example, the concessions on butter and cattle are limited to maximum annual import quantities. Moreover, the agreement permits the imposition of absolute quotas if such action is necessary to the effectiveness of programs restricting domestic production and marketing or providing for the disposal of surpluses.

An escape clause permits any country to act in an emergency; it may suspend its obligations or withdraw its concessions in connection with products unexpectedly imported in increased quantities or under conditions that threaten harm to domestic producers of similar or directly competitive products. Also, the agreement permits the use of domestic and export subsidies, if such are needed in connection with programs for supporting agricultural prices or agricultural incomes.

The charter for an International Trade Organization contains a comprehensive guide for fair behavior in international trade. Much of the charter is a further elaboration of commercial policy provisions agreed on in the Geneva agreement. Broadly, the charter provides for an International Trade Organization and establishes rules for international cooperation in various economic matters; such as the maintenance of employment and of trade, the promotion of economic progress in reconstruction, the prevention of cartels and other restrictive devices, and the cooperative handling of commodity problems through international agreements.

These agreements point toward larger international trade. They embody principles vital to our free economy. They promote American as well as world interests because the United States produces many things in excess of the domestic need and requires a world market for the export surpluses. In general the agreements seek to obviate trade restrictions of the sort that strangled world trade between the wars. They look toward the restoration of commercial freedom.

Currently our agricultural exports are far above the prewar level in volume and in value. Yet fruits, tobacco, cotton, and other products still suffer from trade restrictions imposed by countries that are short of dollar exchange. The European Recovery Program tends to relieve this dollar shortage. But the program is not a solution. Shortage of dollar exchange will end only if foreign countries that buy American products can send more of their own products to the United States and to other countries. Permanent cure of the dollar exchange problem calls, in other words, for greater reciprocity in world trade, such as the agreements mentioned aim to promote.

WATERSHED TREATMENTS UNDER FLOOD-CONTROL ACTS

Watershed-improvement measures, planned and now being installed on a subwatershed basis within 11 authorized watersheds under the Flood Control Acts, are setting the pattern for proper treatment, use, and management of watershed lands to reduce floodwater and sediment damages.

Various measures are now in process of installation in over 300 of these subwatersheds. Included, where appropriate, are such measures as revegetation of denuded areas and steep slopes, grassed waterways, gully control and stream-bank stabilization structures, stabilized roadsides, minor detention dams, improved cutting and logging practices and adequate control of forest fires to reduce impairment of ground cover, terracing, contour cultivation, strip cropping, and improved crop rotations.

The Flood Control Act of 1944 authorized the Department of Agriculture to assist local and State agencies and landowners and operators to install improvement programs on the watersheds of the Buffalo, Potomac, Coosa, Little Tallahatchie, Yazoo, Little Sioux, Washita, Trinity, Middle Colorado, Los Angeles, and Santa Ynez Rivers in aid of flood control.

Representatives of State and local soil-conservation, flood-control, and other districts and agencies, working with field representatives of the Soil Conservation Service and the Forest Service, have subdivided these watersheds into small subwatersheds of a few hundred to a few thousand acres each for the purpose of planning and installing watershed-improvement measures.

Work plans have been prepared for locally selected subwatersheds within these watersheds, showing just what measures are to be installed, where they will be located, who will contribute to the cost of their construction, and what they are estimated to cost. An installation period of 2 to 4 years is customarily planned for a subwatershed.

The control of floodwaters under this pattern of approach begins where the rain falls and the runoff starts, far up on the higher parts of the watersheds, and continues downstream as the waters accumulate. The measures increase the capacity of the soil to absorb and temporarily store water. At the same time they reduce the loss of soil by erosion and the downstream damage caused by sediment. They also provide for the orderly routing of the runoff from the land into the minor watercourses and down to the main streams. By these means the volume of runoff is somewhat reduced, the rush of runoff waters is delayed, the destructiveness of floods on tributary streams is materially reduced, and the peak flows of major floods are cut down to some extent. Additional controls, such as reservoirs, levees, and other main-channel works such as are constructed by the Corps of Engineers are required to cope with the larger mainstream floods, but the watershed-treatment program is needed to help keep sediment out of reservoirs and reinforce these downstream measures.

Ordinary soil and water-conservation measures such as terracing, contour farming, and strip cropping protect and improve the land upon which they are installed, and also provide some flood-control benefits. Since the principal benefit is received by the operator or owner of the farm where the work is done, he bears the principal cost of their installation.

Special measures and structures used to control gullies, stabilize stream banks, and retard runoff in aid of flood control principally provide off-site benefits by reducing floodwater damages on downstream reaches and keep sediment out of stream channels, ditches, and reservoirs. The public bears the major part of their cost primarily through Federal appropriations made from Federal tax revenues.

Measures of all kinds when installed on the national forests and other publicly owned lands are paid for by the public.

Completed Work Demonstrates Improvement

The completed improvement work on the Nepper subwatershed of some 485 acres, a part of the Little Sioux River watershed in Iowa, illustrates the kind of improvement job being done. There rapid runoff has cut large gullies which have been tearing apart the watershed and creating a sediment source that has contributed huge amounts of sediment to help choke up the lower reaches of the river and cover adjacent bottom lands.

The installed water-disposal system, consisting of grassed waterways and gully-control structures, stabilizes 4 gully heads ranging from 12 to 35 feet in depth. It provides stable channel grades for runoff from the upper reaches of the watershed to its outlet into the larger stream. Its principal function, together with conservation measures applied on the watershed lands, is to effect an estimated 75-percent reduction in the volume of sediment passing out of the watershed to cause downstream damage. In addition, it will provide flood protection for approximately 60 acres of fertile bottom land within the watershed that flooded almost annually and some overflow protection for another 100 acres of adjacent land below.

Installation of such a watershed-improvement program is only a part of the job. Keeping the measures in effective operation, to continue yielding benefits year after year, is the final measure of its success. Various State and local public agencies will be largely responsible for this on non-Federal lands. Soil conservation districts are expected to perform an important service in helping conservation-minded farmers to see that the measures are maintained.

Additional completed subwatershed installations will soon be in evidence as the watershed approach to planning and effectuating reduction of floodwater and sediment damages is applied in the authorized watersheds.

Watershed surveys are now under way by the Forest Service and the Soil Conservation Service on a number of additional watersheds. The Department hopes to recommend improvement programs to the Congress on some 40 watersheds, in addition to the 11 now authorized for operation, within the next 2 years. After they are considered by the Congress, they may be authorized for operation by future Flood Control Acts. Installation of improvement measures, in accordance with subwatershed plans, can then be undertaken in them.

STATE AND COUNTY USDA COUNCILS

After the hostilities ceased in 1945, the Secretary of Agriculture called for establishment of State and county USDA councils to replace the USDA war boards. He pointed out that postwar problems would call for continued efforts to improve the coordination of Federal activities in the States and counties and to fuse these activities with State operations and with the planning and work of individual farmers. Accordingly, the cooperating agencies formed the councils; and in the last 2½ years the councils have carried out numerous assignments and undertaken important work on their own initiative.

Natural successors to the USDA War Boards, the State and county USDA councils form a rallying point in the States and counties for all participants in efforts to achieve national farm objectives. Primarily, they facilitate cooperation among the officials of Federal agricultural agencies and between Federal and State officials. Also, they provide a channel for the interchange of ideas, information, and services between official personnel and the farmers. Largely, therefore, the purpose of the councils is akin to that of the wartime boards they supplanted. They seek to promote teamwork in programs for agricultural and national welfare, with the important difference that the goal now is to build peace rather than win a war.

Creation of the State and county USDA councils to succeed the USDA War Boards was recognition that agriculture's postwar tasks would not be less difficult than those of wartime, and in many respects would be similar. Two and a half years have passed. Agriculture has been called on for production at near the wartime level, along with unusual efforts to provide grain for shipment overseas. It has faced arrears of conservation, new problems in long-range policy, the approaching end of wartime legislation, unfavorable commercial foreign trade, accumulated problems in rural health and education, overdue need to improve farm housing and other farm facilities, many problems in marketing, the implications of its own technology, and the European recovery plan. In consequence the State and county USDA councils have had to deal with problems of the kind foreseen, the result partly of the recent war and partly of the Federal Government's concern with basic agriculture. Meantime, nothing has suggested that the usefulness of the councils will decline.

The councils are not planning groups primarily; yet they draw the Department's attention to matters that affect agriculture. Also they help to adapt Federal programs to local needs and conditions. Programs of a national character seldom exactly fit the needs of all the States, even if developed with State cooperation. Sometimes the adaptation is within the discretion and functions of the councils; sometimes it requires action by the Department of Agriculture. The councils let the Secretary know what they think, and inform him as to the opinions of farmers. Often the Secretary asks the councils to give their views, particularly with regard to programs that involve specific duties for the councils. This happens typically when activities cross agency lines or do not belong clearly to any one agency.

HUMAN PROBLEMS IN AGRICULTURE

Agricultural problems in the final analysis usually are human problems—problems of the 27½ million people living on farms and trying to make a good living from farming, problems of the rest of the people in this country who depend upon agriculture for food and fiber, and also problems of many people in foreign lands who have been dependent upon American farmers for food literally to keep alive.

In the long run the level of living of a farm family is probably the best measure of success or failure in farming. In order to measure progress in agriculture it is therefore necessary continuously to study rural life, the human problems in agriculture, the levels of living of farm people and how they compare with those of nonfarm people, and the striving of farmers to improve the rural communities in which they live. Unfortunately there is a great disparity between farm people and the nonfarm population with respect to many elements in the standard of living. The Department has given considerable attention to studies that would be useful to farmers in improving their levels of living and in making rural life generally more satisfying.

Farm-Population and Farm-Labor Research

Basic to this work, in fact basic to the formulation of agricultural policy and the carrying out of many Department programs, is research in farm population. This research, carried on by the Bureau of Agricultural Economics, provides for analysis of census data on births and deaths on farms, migration to and from farms, and of the changes taking place in the number of people living on farms and in the farm work force, including owner operators, tenants, and hired workers.

Information is thus obtained on the long-time as well as the short-time trends in farm population. Migration to and from farms and its effect upon the proportion of the total population in agriculture must be known if we are to have the right perspective in viewing the national economy as a whole and particularly in viewing agriculture in relation to the national economy.

The population research has shown some thought-provoking results during recent years. It showed, for example, that the farm population declined from 30 million to 25 million during the war, and that during the first 2 years following the war it went up again to 27½ million people. Then during the third year after the war there were indications that farm population was resuming the long-time downward trend. The research pointed up stringent farm-labor-supply problems during the war and also indicated that since farm production increased about one-third during the war with 5 million fewer persons on farms, there must have been a considerable amount of underemployment on farms before the war.

This research has also raised questions as to how meaningful are current definitions of farm population. It showed that in April of a recent year (1945) only about 70 percent of the employed persons living on farms were engaged in agriculture, and furthermore that those employed persons living on farms and working in agriculture made up only about 90 percent of the agricultural work force. During the same year 4.2 million different persons worked on farms for wages. Of these only 70 percent lived on farms, 20 percent lived in other rural areas, and 10 percent in urban places. The 4.2 million included 600,000 farm operators who worked as hired workers for other farmers during a portion of the year.

Levels of Living

The level of living consists of the goods, services, and opportunities posseessed and used by people. It includes the entire range of things contributing to their survival, protection, convenience, and enjoyment. There are wide differences in general between living conditions in rural and urban areas. Studies of the levels and standards of living of farm people made in the Bureau of Agricultural Economics show that most farm people are enjoying higher levels of living than before the war, but that as a whole they do not have a parity of living conditions with nonfarm people.

In order to measure the extent to which increases in farm income resulted in improved living conditions, indexes of farm-operator family levels of living have been constructed for all of the counties in the United States for both 1940 and 1945. These indexes show that in 1945 the level of living of farm-operator families was about 25 percent higher than in 1940. The increases were general, the poorer counties gaining as well as the wealthier, and in only about 1 percent of the counties did the level of living decline.

The differences between regions were about the same in 1945 as in 1940. Counties in the highest fifth were generally concentrated in the heart of the Corn Belt, in the industrialized States on the northeast seaboard, and in California. Most of the counties in the lowest fifth were in the eastern Cotton Belt and in the self-sufficing areas of the southern Appalachians. However, while the Southern States had the lowest living level in both 1940 and 1945, between these 2 years they gained more on a percentage basis than the other regions.

Results from another research project completed in the Bureau of Agricultural Economics during the past year show that with the exception of nutrition, nonfarm people surpassed farm people in most of the elements in the level of living for which statistical measures are available at this time, and in most cases they surpassed to an alarmingly high degree.

Nonfarm per capita net income was nearly double that of farm people in 1946 after farm income had risen very substantially during the war. Expenditures for housing, clothing, and medical care in 1941 were lower for farm than for urban families, and there were even greater disparities between farm and nonfarm families in their expenditures for luxury and semiluxury items.

The following table shows that rural farm homes contained far fewer of most of the generally accepted conveniences than did rural nonfarm and urban homes:

Housing and specified material possessions of rural farm, rural nonfarm, and urban population

Item	Percentage of homes in specified classifications			
	United States	Rural farm	Rural nonfarm	Urban
Electric lighting (1945) [1]	89	52	90	98
Running water (1945) [1]	79	28	70	95
Radio (1945) [1]	90	77	90	94
Bathtub or shower (1945) [1]	70	18	56	88
Private flush toilet (1945) [1]	69	17	56	87
Mechanical refrigerator (1946) [1]	60	30	57	68
Ice box (1944) [1]	26	28	25	26
Central heating (1945) [1]	48	15	36	61
Gas or electric kitchen stove (1941) [2]	61	15	31	84
Electric toaster (1941) [2]	52	22	39	65
Electric mixer (1941) [2]	15	7	14	19
Pressure cooker for canning (1941) [2]	9	23	8	5
Vacuum cleaner (1941) [2]	47	24	36	58
Power washing machine (1941) [2]	52	50	51	52
Electric iron (1941) [2]	79	46	68	93
Radio-phonograph (1941) [2]	6	2	3	8
Phonograph (1941) [2]	13	18	12	11
Piano (1941) [2]	23	28	21	22

[1] Characteristics of occupied dwelling units, for the United States, November 1945. Bureau of the Census Series H–46 No. 1 Washington, D. C., May 16, 1946.

[2] Ownership of Household Equipment in Relation to Income and Size of Community. Monthly Labor Review, Bureau of Labor Statistics, Washington, D. C., December 1945.

The results of this research show further that there is a striking disparity between rural and urban places in the number of medical facilities readily available. Fewer doctors, dentists, and hospital beds are readily available to farm people than to the urban population. Only about one-third of the births in the farm population are attended by a doctor in a hospital, while among the nonfarm population two-thirds of the babies are thus assisted into the world. Also three times as many farm births as nonfarm births are attended by midwives.

The study also showed that there is a vast disparity between farm and nonfarm areas in the school facilities available to young people. School terms are shorter in rural areas than in cities and rural pupils spend fewer days in school than urban pupils do. While there are fewer pupils per teacher in rural areas, the same teacher is more likely to have several grades and subjects. The value of school property, the current expenses, and school indebtedness are lower in rural than in urban areas. In 1940, 84 percent of the 12-year-old boys and girls living in cities attended school and less than two-thirds of the farm children of the same age were in school. Less than a fourth of the farm population aged 25 to 30 have finished high school, compared with 44 percent of the urban population of the same age.

The levels of living of farm people and the comparison between their living conditions and those of nonfarm people are important for several reasons. A substantial segment of our population is rural and a still larger part grew up in rural areas.

An adequate level of living on farms is essential to maintaining a good farm citizenry and to insure that the young men and women who migrate to cities from farms have an equal opportunity with young people who have been reared in cities.

Rural Organization

During the past year the Department, through the Bureau of Agricultural Economics, has continued its cooperative program of studying rural organization and rural community developments with the land-grant colleges. These studies have shown that the number of organizations and agencies serving farm people has steadily increased with the increasing complexity of American agriculture. The nature and types of these organizations have become more specialized with the increasing need for organized activities.

There has been a continuing movement of schools, churches, and business establishments from the open country to villages and towns. More of the farmers' organized activities are similarly centered in towns. Many State and Federal agencies not in existence a few decades ago are now serving farm people, and practically all of them depend on farmer participation in voluntary organizations, through which to operate and serve effectively. Producers' farm supply or marketing cooperatives, agricultural conservation associations, soil conservation districts, rural electrification cooperatives, general farm organizations, agricultural extension services, and many other groups are found in most rural counties.

While higher levels of income enable many farmers to purchase some things which raise their level of living there are other things, such as rural education and health services, for example, that individual families even with good incomes cannot purchase unless the communities in which they live are organized to provide them. These studies of rural organization are aiding farmers in finding the means of providing themselves with those needed services that can be obtained or maintained only through group effort.

Consumers' Preferences

During the past 2 years the Bureau of Agricultural Economics has broadened its marketing-research activities to include more research to find out consumers' reactions to various farm products. Farmers in planning their production and marketing activities, as well as processors and manufacturers, need information related to consumers' preferences with respect to farm products and the factors affecting their choices, since market outlets are influenced to an important degree by the actions of ultimate consumers. Surveys are being made to obtain information on consumers' buying habits, wants, and desires, and particularly on the reasons for their preferences and dislikes. The results of these surveys on the one hand are helpful to consumers, and on the other hand are helpful to farmers in securing a maximum market for their products and in obtaining a satisfactory income.

A consumer-preference study already completed obtained information from both urban and rural housewives as to their preferences with respect to selected women's wear items and household textiles. This survey was addressed to the problem of the competitive position of cotton and other fibers in specific end-use markets. It shows the number of women who buy each of the various articles studied, fiber preferences, the reasons for preferences or dislikes, and the characteristics in each of the women's wear articles and househould textiles that women consider to be most important. The findings of the study supply a basis for exploiting more efficiently the desirable features and overcoming the undesirable features of these materials.

A report of this study entitled "Women's Preferences Among Selected Textile Products," Miscellaneous Publication No. 641, was published during the year. Work is now under way on a companion study in the field of men's clothing. Particular attention is given in this study to preferences with respect to cotton and wool. Other consumer-preference studies on potatoes are being carried out, and surveys of consumers' preferences with respect to citrus fruits are being planned for the late spring and summer of 1948. The same opinion and attitude survey techniques as used in consumer-preference studies are being applied to other problems. During the year a survey of the Extension Service program in the State of Vermont was completed and a nutrition survey was made in Richmond, Va.

Nutrition Survey

After the war food program had been under way for a few years, including an intensive educational program, the Nutrition Programs Branch of the War Food Administration decided it was time to take stock. It requested the Bureau of Agricultural Economics to survey the situation in a selected city (Richmond, Va.) and obtain information which would be helpful in bringing about improvements in the nutrition program. Such a study was completed during the past year. The results indicated that in the area studied slightly less than half the housewives had some knowledge of modern nutritional science, a very small number, about 4 percent appeared to have adequate knowledge about nutrition, and about half had little or no nutritional information. When the adequacy of the daily menu was evaluated it was found that about half the housewives provided at least the minimum number of servings suggested for each food group. The study indicated that there had been no significant change in the number of housewives who had an adequate knowledge of nutrition since 1943, when a somewhat similar study had been made.

The most popular sources of information about nutrition were found to be newspapers and magazines, booklets and pamphlets, friends and neighbors, and the radio. The results of the study indicate that two of the most effective methods to get housewives to use nutrition information would be: (1) To point out that the foods they should eat are better for the health and growth of their children, and (2) to point out that if they eat the foods they should, their family members are likely to have more energy and live longer.

ECONOMIC RESEARCH AND SERVICES

Outstanding in the Department's economic services during 1948 was the report on long-range prospects for American agriculture prepared by the Bureau of Agricultural Economics in response to a request by the House Committee on Agriculture, and subsequently published by that committee. Some of the findings appear in the chapters of this report entitled "European Recovery Program" and "Long-Time Farm Adjustment."

Another important BAE study during the year dealt with farm mechanization. Findings of this study likewise constitute the subject of a special chapter in the present report. Worth mentioning here is the Bureau's statement that in 1945 each farm worker in the United States produced enough to support himself and more than 13 other persons. In 1920 each farm worker supported himself and only a little more than 9 other persons. In 1820 the average farm worker supported himself and only a little more than 3 other persons. Attributable partly if not largely to farm mechanization, this astonishing growth in the American farmers' productivity forms the subject of a complex analysis in the Bureau's machinery report, which notices among other things that tractors on farms in the United States in 1948 numbered more than 3,150,000 as compared with only 372,000 in the early 1920's.

Under the Research and Marketing Act of 1946, the BAE conducted a number of research projects on marketing and started others. These projects involved cooperation with State colleges and experiment stations; some of them dealt with a combination of marketing and production problems. Through its Agriculture Estimates Branch, the Bureau continued its extensive and vitally important crop-reporting work. A noteworthy recent development in this branch of the Bureau's activities is the rapidity with which the primary data are now summarized and published. Major reports appear within a week or 10 days after the collection of the facts. Besides crop data, the Agriculture Estimates Branch of BAE gathers and publishes statistics of prices received by farmers, prices paid by farmers, the number of people at work on United States farms, and the wages they receive. In April the Bureau surveyed postwar developments. Gathered from more than 11,000 farm operators in 814 counties representative of all the States, the survey data followed up an earlier investigation in the same counties. Farm employment and wages, crop acreages, farm tenure, accidents to farm people, marketing channels, and transportation methods were among the subjects covered. As the farms embraced in the survey represented a cross section of all farms in the United States, the findings should have wide application as soon as they are analyzed and issued.

Certain long-established services of the BAE had more than ordinary usefulness in 1948. For example, the twenty-fifth annual agricultural-outlook conference held in November 1947 in cooperation with the Extension Service set up guides for farmers and agricultural agencies in meeting the year's exceptional demand for food in connection with European recovery. The outlook report indicated desirable regional and national adjustments in farming, showed the probable bearing of American and foreign economic and other policies on the general economic outlook, and underlined nutrition requirements at home and abroad.

Prices, Costs, and Earnings of Farmers

The BAE investigated margins and marketing costs for certain agricultural products, among them hides and skins, leather and leather products, and poultry and eggs. Results will be made available in technical bulletins. Cooperatively with the State experiment stations of Connecticut, Massachusetts, and Rhode Island, price relationships of milk and cream in northeastern markets were analyzed.

The Bureau's third annual Balance Sheet of Agriculture forms the subject of a special section in this report. Other BAE work in 1948 of interest to farmers and the general public dealt with life insurance for farm families; with farm real estate values; farm population; farm income by income groups; farm labor; farm levels of living; and with rural communities and organizations. A study of farm-land ownership, long needed, is under way.

AGRICULTURAL AND INDUSTRIAL CHEMISTRY

Department chemists are continuing to find new uses for agricultural materials and to expand industrial markets for farm products. Better canned and frozen foods, a high-quality synthetic rubber from lactic acid, improved methods for finishing cotton fabrics, and new antibiotics of potential importance to medical science are a few of the research achievements reported during the year by the Bureau of Agricultural and Industrial Chemistry.

This Bureau employs about 1,400 people in the 4 large regional research laboratories—at Peoria, Ill. (Northern); Wyndmoor, Pa. (Eastern); New Orleans, La. (Southern); Albany, Calif. (Western)—and in 18 other laboratories throughout the country. They are engaged in chemical research to develop new and improved products from agricultural commodities, with the aim of increasing industrial outlets for things the farmer grows. The Bureau is building a new fruit and vegetable chemistry laboratory at Pasadena, Calif., which is expected to be completed by the spring of 1949. It will replace the laboratory now maintained in Los Angeles.

Improved Food Products

In answer to the expressed needs of the food-processing industry, the Western Regional Laboratory is conducting extensive research on the freezing preservation of fruits, vegetables, and poultry products. These investigations have provided useful data on the factors which affect taste, nutritional value, and keeping quality of many conventionally frozen and dehydrofrozen products, including green peas, asparagus, sweet corn, apples, apricots, and chicken and turkey meat.

Dehydrofreezing, a process involving partial dehydration of fruits or vegetables to reduce weight and volume, followed by quick-freezing and ordinary frozen-food storage, is a major contribution by the Laboratory to new methods of food processing. Its potential economic advantage is the saving in packaging, transportation, and storage costs made possible by the reduced weight and bulk of the final product.

The laboratory has worked out detailed methods for dehydrofreezing apples and peas, and in consumer-acceptance tests they compare favorably with the conventionally frozen product. Dehydrofreezing of apricots is being developed, and exploratory work has been done on peaches, cherries, carrots, and potatoes. Although processing costs in dehydrofreezing are expected to be greater than in ordinary freezing, lower packaging, storage, and distribution charges should enable the institutional buyer of dehydrofrozen products to save about 20 percent on purchases of frozen food.

The Bureau's laboratory at Pullman, Wash., has given assistance to the pea-processing industry of eastern Washington and Oregon in the construction and operation of 14 commercial froth-flotation units for cleaning green peas. The difficulty of eliminating nightshade berries and other foreign substances has been a serious problem in this region. The froth-flotation method, which cleans the peas efficiently, saved canneries and freezing plants in the Pacific Northwest an estimated $330,000 during 1947. When the process is fully exploited, total savings may amount to $2,000,000 annually.

The citrus laboratory at Weslaco, Tex., has developed a process for heat pretreating grapefruit to reduce the amount of peel oil and improve the flavor of canned grapefruit segments and juice. The process is now used by at least three-fourths of Texas grapefruit canners, and its value to the industry each season is estimated at half a million dollars.

Food manufacturers show an active interest in concentrated essences of apples and other fruits, which can be used in fruit products to restore the flavor lost in processing. The Eastern Regional Laboratory has constructed a portable flavor-recovery unit to collect volatile flavor essences in the field. With this device, essences were obtained from strawberries, peaches, blackberries, youngberries, rhubarb, huckleberries, grapes, and apples. The Federal tax of $9 per gallon on fruit essences containing more than 0.5 percent alcohol is giving some concern to potential users, but work to produce satisfactory flavor concentrates having less than the taxable amount of alcohol is continuing.

The Northern Regional Laboratory has developed a successful fermentation process for producing riboflavin (vitamin B_2 or G) for livestock rations or human consumption. The process has attracted wide industrial interest, and several companies are conducting pilot-plant trials. Riboflavin is one of the growth-promoting vitamins, and commercial feed mixers use large quantities of it for the enrichment of prepared feeds. Preliminary cost estimates indicate that the vitamin can be produced by the new process for about 5 cents a gram.

New Industrial Products and Processes

During the war the Northern Regional Laboratory developed a highly satisfactory cork substitute from peanut hulls, called Noreseal, for lining bottle caps. Recent research shows that a vegetable gel made by the laboratory from soybean flakes is a good adhesive for sealing either cork or Noreseal to metal caps. Since beverage manufacturers last year used about 18 billion such crown seals, this potential outlet for soybean gel is quite large. The new product also has other adhesive applications and various food uses.

A soybean adhesive previously developed by the laboratory has been adopted by a large cartridge company for making shotgun shell casings. It is now used in about half the shotgun shells produced in the United States.

The laboratory has recently announced a new process for making fine paper pulps from straw which gives yields of bleached pulp about 10 percent higher than former methods at lower chemical cost. This pulp can be blended with wood pulps to produce a variety of fine and specialty papers. Previous research on straw utilization by the laboratory has led to improved packaging materials and building-board products from straw.

In 1947 this country produced approximately 95 million tons of wheat straw. About 40 million tons was wasted or burned. The wasted straw could have supplied two-thirds of the national requirements for cellulose pulps. But straw is more difficult to collect, package, and transport than pulpwood. At the laboratory's suggestion, strawboard and farm-equipment manufacturers are working jointly to solve this economic problem. A wide educational program on the possibilities of increasing farm income by sale of straw to industry has been conducted this year by the Department of Agriculture and manufacturing concerns interested in better straw collection.

Improvements have been made at the Northern Regional Laboratory in the fiber synthesized from zein, a corn protein. The new process permits elimination of the acetylating treatment formerly required and gives a fiber which can be dyed satisfactorily in the acid dyes normally used for wool. Zein fiber, best of the fibers so far made from proteins, has a dry strength equal to that of wool, a wet strength about half the dry strength, and a shrinkage of 10 percent or less under the severe condition of acid dyeing.

At the Southern Regional Laboratory considerable progress has been made in the development of Sarelon, a peanut-protein fiber. An industrial firm which has been producing the fiber on a pilot-plant scale has recently announced its intention of beginning full-scale production. Work is continuing at the Eastern Regional Laboratory on casein fiber and bristle and at the Western Regional Laboratory on fiber from keratin, the protein of chicken feathers.

For the past several years, attempts have been made to improve the usefulness of nicotine as an insecticide by finding a suitable synergist, or activator. Several hundred compounds were tried at the Eastern Regional Laboratory before one was found which had a definite activating effect. This substance, phthalonitrile, when mixed with nicotine showed definite synergism against some plant pests but doubtful or no synergism against others. Although the toxicity of the nicotine was doubled or trebled in some cases, phthalonitrile may not prove to be a practical synergist for general use. The discovery of its activating effect does indicate, however, that synergism with nicotine is possible, and the search for other synergists can continue with increased confidence.

The Eastern Regional Laboratory has developed a new method for recovering tannin from the roots of the canaigre plant and is assisting in work to increase the tannin content of various strains of domestic sumac. Most tanning materials now used in the United States are imported. Better methods of treating leather for mold-prevention, retanning shoe inner soles with alum to make them more serviceable and to prevent shrinkage, and improved curing methods for hides and skins are other contributions of the laboratory.

A high-quality acrylic rubber called Lactoprene EV has been developed at the Eastern Regional Laboratory. It is the most promising of several lactoprenes, or rubberlike substances derived from lactic acid. The lactoprenes are unusual in that butadiene or similar compounds used in making most synthetic rubbers are not required for their manufacture. They are simpler to produce than butadiene rubbers, can be vulcanized without sulfur, and show superior endurance to repeated flexing. Their gas-permeability is low, and they are unusually resistant to enlargement of cuts and to deterioration by oils, oxidation, and aging at normal or elevated temperatures.

Lactoprene EV has higher heat resistance than natural rubber or any of the other synthetic rubbers except silicones. A simplified continuous process for its manufacture has been worked out. One of the large rubber companies, which already has an acrylic rubber of its own on the market, has begun experimental production of this outstanding new elastomer.

Synthetic Liquid Fuels From Farm Residues

The Northern Regional Laboratory has continued its research on a process to obtain fermentable sugars from agricultural residues for the production of liquid fuels. A survey of the availability of agricultural residues for saccharification indicates that there are sufficient corncobs and other crop residues immediately available to support 15 synthetic-fuel plants in the United States. These plants, each using 100,000 to 200,000 tons of residues a year, could produce annually about 170,000,000 gallons of fuel.

In the process for changing these agricultural residues to sugars and producing liquid fuels, pentose sugars obtained from one fraction of the residues are fermented to the liquid fuels butanol, acetone, isopropanol, and ethanol, with furfural as a byproduct. Dextrose from the cellulose fraction is fermented to ethanol (ethyl alcohol).

Bureau research in this field includes investigations of gasoline-alcohol fuel blends and alcohol-water mixtures injected into engines as coolants to prevent detonation and permit wider use of low-octane gasoline. Regular gasoline with 20 percent alcohol and premium gasoline with 10 percent alcohol were found to give performances at high compression equal to that of 90-octane gasoline.

Improvement of Cotton and Naval Stores Products

Cotton still is generally considered the best all-round textile fiber and has upheld its superiority in the face of the recent remarkable improvements in rayon and other competing materials. Nevertheless, cotton's continued dominance can be ensured only if unusual progress is made in improving cotton products. Surveys made at the Southern Regional Laboratory during the past year show that consumption of various synthetic fibers is increasing rapidly as their quality is improved and that cotton will be able to maintan its primary place only if production costs are lowered and if the textile quality of cotton fiber can be improved.

Much practical knowledge has been gained during the year in research on tire cord, cotton's most important single end use. Investigations of tire-cord fatigue life, for instance, show that failure is the result of total flexing of the cord, and that fatigue is not overcome during intervals of relaxation after flexing. A ply-building machine developed by the laboratory is now being used by one southern tire manufacturer to make experimental tires, and several firms are interested in the laboratory's constant-tension stretcher for tire cord.

The partial-acetylation process for rotproofing cotton yarn and fabric developed at the laboratory is approaching commercial application in several fields. Industrial tests of this treatment are being conducted with cotton materials intended for plastic laminates, seedbed covers, varnished fabrics for electrical insulation, and fishing nets and lines. Two manufacturers have decided to use the process in treating bags for household water-softener systems. Other tests show that partial acetylation may give tire cord added resistance to heat as well as rot resistance.

Outdoor fabrics such as awnings, tents, tarpaulins, shade cloth, and seedbed covers can be improved by chemical treatment to resist the effects of weather and still retain their textile quality. Precipitation in the fiber of lead chromate, which screens out the sun's rays responsible for deterioration, is a practical treatment for tobacco shade cloth. By treating army duck with clear, light-screening compounds such as urea-formaldehyde resin, improved weather resistance is obtained with no change in fabric color.

"Turpentine farming" has become increasingly important in the South during the last 20 years, largely as a result of research by the Bureau's Naval Stores Division to improve methods of pine-gum processing and find new uses for naval stores products. Central processing plants are now able to purchase a gum on the basis of relatively high yields of rosin and turpentine, which means higher returns to the 40,000 farmers who supply them.

In the past year, the Naval Stores Division has furthered the utilization of naval stores products as raw materials for industry, particularly through separation and analysis of resin acids. Increased industrial use of chemical derivative of turpentine and rosin is necessary to assure the future of the naval stores industry.

The continuous steam still for processing pine gum developed at the Olustee, Fla., naval stores station has been enlarged and improved. The new still, equipped with a 12-inch stripping column, makes possible a 50-percent saving in steam consumption and labor compared with batch-operated stills of equal capacity. The continuous-type has several other operational advantages, requires less floor space, and can be constructed at lower initial cost than the stills currently used.

Contributions to Medical Science

The important physiological effect of rutin on capillary blood vessels was first postulated at the Eastern Regional Laboratory, and the University of Pennsylvania Medical School, working in collaboration with the laboratory, demonstrated that rutin was effective in the treatment of capillary fragility. This discovery and later medical applications of the new drug constitute one of the most noteworthy advances in chemistry and medicine of recent years.

Rutin lessens the severity and duration of hemorrhage in hemophilia and effects a general improvement in the condition of the patient. It is invaluable for preventing injuries from frostbite. The fact that rutin gives protection from the harmful effects of X-rays has suggested that it may have value as a prophylactic against injury from atomic radiation.

The laboratory found that the buckwheat plant is an economical source of rutin and developed practical procedures for its manufacture. Considerable improvement has been made recently in extracting the drug from green or dried buckwheat. The process has been made more efficient through use of hot solvents, and extraction time has been reduced to half an hour. Two factories producing rutin on a commercial scale are already employing the improved method.

Polymyxin, another new medicine, was first reported by the Northern Regional Laboratory in April 1947. It was discovered independently at two other institutions, the American Cyanamid Co. in this country and the Wellcome Physiological Research Laboratories in England. This antibiotic has proved highly active experimentally against organisms causing typhoid, plague, one type of pneumonia, undulant fever, brucellosis, tularemia, and whooping cough.

Recent work at the Northern Regional Laboratory has led to the development of a superior method for estimating the potency of polymyxin. Modification of the producing bacterium has resulted in new strains which produce five times as much polymyxin as the original strains.

The Western Regional Laboratory has made definite progress in the production and evaluation of the antibiotic subtilin. This potentially valuable medicine is being tested by various research organizations to determine its effectiveness in treating bovine mastitis, trichomoniasis, rickettsial infections, tuberculosis, tropical ulcers, and other diseases. Juice from waste asparagus butts was formerly employed to feed the producing organism, but a medium containing sucrose and ammonium citrate has recently been found more satisfactory. Improved methods for producing subtilin have increased yields and reduced the amount of labor required.

Chemical Investigations

A slow-acting nitrogen fertilizer that feeds crops over a long growing period has been developed by the Department. The fertilizer is one of a series of combinations of urea and formaldehyde, known as Uraform. It is produced at present only on a laboratory scale. Results of laboratory and greenhouse tests with the material were recently demonstrated at Beltsville, Md. It appeared that Uraform is superior to natural organics in supplying nitrogen at a uniform rate over a long growing period. Unlike commercial nitrogen fertilizers now used, Uraform does not leach out of the soil easily. It offers promise as a source of nitrogen for corn, potatoes, and tobacco crops, which ordinarily need additional fertilizing after they have been planted. Application of Uraform at planting time would save labor. Its delayed action and long duration would also make it a valuable fertilizer for lawns and other grasses. The tests show that Uraform may be used in mixed fertilizer as well as in separate applications. Because it does not appear to be affected by moisture absorption, Uraform offers possibilities as a conditioner that prevents caking, often a serious problem in mixed fertilizers.

Mineral Deficiencies in Soils

Surveys of mineral deficiencies in the United States have shown that cobalt deficiency seems to be more widespread than had been anticipated. Reports of cobalt deficiency in forage animals have been made from Wisconsin to Maine and along the Coastal Plain to Florida. Deficiency of cobalt in the forage results in a loss of appetite in the animals, some anemia, and a general "wasting away." If the deficiencies are extreme and are not corrected, they result in the eventual death of the animal. The deficiency may be cured by feeding the animal small amounts of cobalt salts.

Through a study of the various reports, evidence is accumulating that certain types of soils are more apt to be deficient in cobalt than other types. It is hoped that, through a detailed study of the cobalt content of soils and vegetation in various regions, a generalization as to the type of soil and the amount of cobalt necessary to give best growth of animals may be reached. It is possible that in many areas just sufficient cobalt is present to give fair growth of the animals and actual deficiency symptoms are not recognizable. It may be that additional cobalt in these cases would result in better growth and health of the animals, and it is anticipated that careful laboratory studies of the problem will lead to the correction of these marginal deficiencies, as well as the precise demarcation of the areas where acute deficiencies occur.

PLANTS, SOILS, AND AGRICULTURAL ENGINEERING

Research conducted by the Bureau of Plant Industry, Soils, and Agricultural Engineering in cooperation with State agricultural experiment stations gives continued hope for better crops and higher yields per acre.

For example, recent experiments on corn culture in North Carolina under ordinary farm conditions show that corn yields for that area can be increased several fold through a combination of improved practices.

These experiments, which were started in 1944 in cooperation with the North Carolina State Experiment Station, applied in combination new knowledge about specific corn production practices developed in different fields of science. The plant breeders' knowledge of corn hybrids; the soil scientists' knowledge of soil types, fertilization, and plant spacing; and the agricultural engineers' knowledge of weed control and fertilizer-application methods were integrated into one experiment.

North Carolina corn yields average only 20 bushels per acre when corn is produced with the traditional practices of using little if any fertilizer, planting open-pollinated varieties, growing about 4,000 plants per acre, and controlling weeds with deep cultivation. Yields of more than 70 bushels per acre were consistently obtained in experiments where a heavy application of nitrogen properly placed in relation to the plants was combined with growing adapted corn hybrids, increasing the number of plants per acre, and controlling weeds with early shallow cultivation.

The change in yield varied under different practice combinations. No appreciable change resulted when a light nitrogen application was combined with closer plant spacing, but yields were substantially increased when a heavy application of nitrogen was used. Yields were also increased when a heavy application of nitrogen was applied with only normal plant spacing, but the increase was doubled with closer plant spacing.

On Norfolk loamy sand, yields of corn hybrids were increased 20 bushels per acre by increasing nitrogen application from 20 to 170 pounds on a field growing 4,000 plants per acre, and an additional 17 bushels per acre yield increase was obtained at the high nitrogen level by increasing the number of plants to 13,000 per acre. By combining heavy nitrogen application with closer plant spacing, yields were increased from 41 bushels to 78 bushels per acre. In another experiment under good rainfall and soil-moisture conditions, the per acre yields were increased from 19 bushels where no nitrogen was used to 107 bushels where 120 pounds of nitrogen was used.

The highest corn yields were obtained by combining row fertilization with top dressing. However, top dressing increased the yield less when row fertilization was heavy. Experiments conducted in 1947 indicate that heavy row fertilization stimulates early plant growth provided an appropriate fertilizer-distributing machine is used which will place the fertilizer band at a uniform distance from the seed.

Deep or late cultivation was found to be a detriment to high yields. Late cultivation was unnecessary when heavy row fertilization was combined with closer plant spacing and early shallow cultivation because shade was sufficient to control weeds after the corn was 2½ feet tall.

Yields from adapted corn hybrids in all these experiments were 25 to 40 percent greater than from open-pollinated varieties.

Experiments on Various Soil Types

The North Carolina experiments were conducted on several soil types important in corn production throughout the Southeastern States. Specific fertilizer requirements varied on different soil types, and yield increases were greater on some soils than on others, but the greatest yields were obtained on all soils tested through a combination of improved practices. By using soil surveys in interpreting this new knowledge it is possible to predict where the practices are applicable and corn yields that might be expected on various soil types throughout the Southeastern States. By 1960 perhaps 50-bushel-per-acre corn production in this area will be the rule rather than, as today, the exception.

North Carolina corn yields have already been increased as a result of these experiments. By applying improved practices in combination on only a part of the land, the average North Carolina corn yield in 1947 was increased to 30 bushels per acre—a 50-percent increase over average yields produced in previous years with traditional methods. And growing conditions were no better than normal. Application of the new knowledge is spreading rapidly, and in the future a widespread use can be expected in the entire southeastern area of the United States.

Experiments with corn production on irrigated lands in the Columbia River Basin further demonstrate the advantages of research conducted under one integrated program. The average farmer in this region using traditional practices is producing about 43 bushels of corn per acre. In 1947 yields up to 193 bushels per acre were obtained in field experiments, using improved practices in combination. The supply of nitrogen and water was increased in proper balance for the particular soil type, and the best adapted corn hybrid was planted with the optimum number of plants per acre, and grown with the most favorable cultural practices.

At Hermiston, Oreg., it was found that adding more irrigation water to present practices in use on Ephrata loamy sand produced no change in corn yields. When the fertilizer application alone was increased, corn yielded over 90 bushels per acre. When both water and fertilizer were increased the yield was as high as 130 bushels per acre. Furthermore, yields were 15 to 20 percent greater when the fertilizer was applied in three applications at 6-week intervals. No significant change in yield resulted from increasing the number of plants beyond 15,000 per acre, which is the number traditionally grown in this area. With moderate fertilization yields varied from 74 to 172 bushels per acre with over half of the varieties yielding 100 bushels per acre or more. With heavy nitrogen fertilization different hybrids varied from less than 100 bushels to the top yield of 193 bushels per acre for the variety Kansas 2234.

Corn experiments carried out under irrigation at Prosser, Wash., on Ritzville fine sandy loam soil produced nearly as great a response to fertilizer as the experiments on Ephrata loamy sand at Hermiston. Where moisture and spacing were adequate, nitrogen fertilization increased yields from 20 bushels per acre to 178 bushel per acre.

The North Carolina and Columbia Basin projects demonstrate that, through research integrating plant, soil, and engineering phases of production, relationships are established that cannot be determined when research on each phase of production is separate. Furthermore, the product of the research is more intelligible and useful to the individual farmer because in his operation the various production phases must be integrated.

Results obtained from these corn experiments give new hope for more efficient production of other crops. Plant, soils, and engineering scientists believe, for example, that cotton production efficiency might be increased fourfold through the proper combination of improved practices.

One Variety Cotton Communities

Larger yields are harvested from cottonfields planted with improved varieties. Better quality cotton is marketed from "one-variety communities." Both yield and quality are further increased when improved fertilizer, soils, and cultural practices are used. Farmers in the Haralson Community of Coweta County, Ga., for example, have more than doubled their average per acre cotton yield—from 156 pounds of lint per acre 15 years ago to an average of 368 pounds for the last 3 years—by applying in combination these improved practices.

But mechanization offers the greatest hope for increasing cotton-production efficiency. Research studies have shown that with present production and harvesting methods, which include many hand operations, labor requirements per acre, for cotton total at least 73 man-hours. With all operations mechanized, even with present practices and equipment, it already has been demonstrated that these requirements can be lowered to 9½ hours.

The biggest step forward in cotton mechanization will be the further development and adoption, where practicable, of mechanical cotton pickers. But mechanization of the cotton harvest depends also in part on solution of many other related problems that range through the whole field of plant breeding, production, harvesting, and ginning.

So closely interrelated are these problems that the solution of one is directly dependent on the solution of others. Various phases of cotton research are now being directed toward mechanization. Plant breeders, for instance, are working to develop smooth-leaved, evenly maturing, high-yielding varieties adapted to mechanization, while the agricultural engineers are concentrating on developing machines for all production phases.

The corn and cotton projects are examples of the beginning that has been made in integrating related phases of crop-production research. But there remains a mass of individually valuable improved practices, developed in the different specialized fields of science, yet to be tested in combination. In addition, new practices are continually being discovered as scientists continue their search for better ways to overcome the factors limiting crop production.

Research in Weed Control

Weeds are being controlled more effiectively on many farms with new supplemental methods employing flame, petroleum derivatives, plant-growth regulators, and other chemicals. And only a beginning has been made. Recent experiments indicate that weed-control methods might be completely revolutionized.

Flame weeders are being successfully used in cottonfields in some parts of the South and show promise on other crops. Tests indicate that the same machine might be adapted to cotton chopping. More investigations are needed with flame equipment to determine the heat intensity plants will stand, and the most effective ways flame can be applied.

Experiments with small grain have demonstrated that 2,4-D properly applied can substantially increase yields in fields heavily infested with broad-leaved weeds. Rice yields were increased as much as 50 percent when 2,4-D was applied on weed-infested fields. Similar experiments with wheat increased yields enough to more than pay weed-control costs. Experiments are underway to determine satisfactory methods for applying the chemical to one field without affecting susceptible crops in adjacent fields.

Initial experiments with "preemergence" treatment indicate it may be possible to "lay corn by" before it sprouts. By spraying the ground with 2,4-D between the time of planting and sprouting, both grass and broad-leaved weeds were effectively controlled for the season. However, more research is needed before "preemergence" treatments can be recommended. If applied improperly the corn as well as the weeds may be killed.

Progress in Controlling Plant Diseases

Significant progress is also being made in controlling plant diseases. Wheat loss from stem rust in the Northern Great Plains has been reduced to a fraction of what it was 10 years ago. Larger yields are being harvested in the Central Great Plains from fields planted to new varieties that combine resistance to leaf rust, loose smut, and hessian fly. Farmers are shifting to the new varieties as fast as seed supplies become available. Introduced commercially as late as 1945, Pawnee, Comanche, and Wichita were grown on 43 percent of the 1947 Kansas wheat acreage.

Similar disease-control progress has been made with oats, sugar beets, potatoes, tobacco, and many other crops. A new disease—helminthosporium blight—struck the 1946 oat crop. By 1948 enough seed of newly developed blight-resistant varieties was available to supply a major part of the affected area. The sugar-beet industry in the West was almost wiped out by a plant disease—curly top. Plant breeders developed curly-top-resistant varieties, and today sugar beets are produced in the West more efficiently than before the disease struck.

Plant-disease control, however, does not end with the introduction of resistant varieties. A constant vigilance must be maintained. For instance, by urging resistant varieties wheat growers had effectively controlled stinking smut or bunt by 1942. Since then some farmers in the Pacific Northwest, where the soil is bunt-infested, have drifted back to growing higher-yielding bunt-susceptible varieties. Consequently, in 1947 one ear of wheat out of every eight ears marketed in the Pacific Northwest graded "smutty."

Study of Weather Factors in Crop Production

Although no way has yet been found successfully to control the weather, scientists are making progress in overcoming some plant-production limitations caused by weather conditions. Plant varieties, adjusted to temperature and moisture extremes, have been developed that increase yields in known areas of production and extend production to new areas.

For example, wheat yields in the Great Plains have been increased during the last 30 years with varieties that mature as much as 1 week earlier—in advance of the hottest weather. Commercial corn production has been extended hundreds of miles to the north and west since 1900 through the development of early-maturing varieties. Windfall losses of apples and pears can be eliminated by spraying trees with chemical plant-growth regulators that cause the fruit to hang tightly to the branch while ripening.

Scientists are encouraged by these results, but scores of climatic problems need further investigation. Through intensive research in this field more winter-hardy plant varieties could undoubtedly be developed; and methods might be found to overcome other climatic hazards, for example, methods to delay fruit budding until after frost danger.

Applications of engineering in crop production, harvesting, and processing tend to overcome weather hazards. Modern machines make it possible for farmers to complete planting, tending, and harvesting jobs during short periods of favorable weather. The day of sun-drying of forages and other commodities with consequent heavy losses in nutritive elements through bleaching and other weathering action is now giving way to mechanical conditioning—dehydration in some cases, refrigeration in others.

Studies of Agricultural Machinery

Since harvesting is a major labor-consuming operation, emphasis has been given to research on mechanical harvesting methods. Corn pickers and grain combines have been perfected by the farm-implement industry for harvesting cereal crop, but much work remains to be done in devising and perfecting machines for harvesting other crops such as peanuts, tung nuts, sugarcane, sugar beets, tobacco, sweetpotatoes, and many truck crops. As in the case of cotton, the problems are complex and successful mechanical harvesting will depend upon the development of more suitable varieties and the combined use of several related production practices. Changing one operation without changing accompanying operations provides only a partial answer to mechanization. Improvements in harvesting may be handicapped by lack of accompanying improvements in other practices.

Corn storage, for example, has become a greater problem with widespread use of picking machines. Storing corn has always been a problem because of the nature of the crop. Conventional cribs used on most farms were designed for curing corn picked over a period of several weeks. The corn picker has made it possible to fill those cribs in a few days as large amounts of corn are picked in a short time, often early in the picking season when the moisture content is high.

Experiments with mechanical driers using forced heated air on high-moisture ear corn in farm cribs were conducted last winter in several Midwestern States. In every test made the moisture content was reduced enough to make the corn safe for summer storage and feeding, and the corn grade was increased enough to more than pay for drying costs in case the corn was sold. In one Indiana experiment the cooperating farmer made more than $500 additional net profit from a 1,035-bushel crib of high-moisture corn by drying it artificially before selling.

As a result of these experiments, modifications in the design of farm driers are being recommended to machinery manufacturers.

Storage, Transit, and Related Problems

Research with other crops in storage, and in transit to market has produced new methods of increasing efficiency and reducing losses. For example, experiments with apples revealed that a new plant-growth regulator—naphthaleneacetic acid—applied immediately after picking retards the development of scald in apples, a condition that has been a costly plague to apple growers.

Marketing costs for California orange growers have been reduced $200,000 annually by a change in cooling practices resulting from experiments comparing natural cooling (using the cold mountain air) with artificial refrigeration of oranges in transit.

Shipping regulations established by the National Perishable Freight Committee required that air-intake vents on fruit and vegetable refrigerator cars be closed when the outside temperature goes down to 32° F. Under these conditions cars loaded with warm oranges required icing to prevent spoilage. Scientists found that the same results could be obtained without icing during winter months if air vents were left open until the train had passed over the western mountain range, or until the outside temperature dropped to 20° F.

As a result of this discovery the National Perishable Freight Committee modified its regulations for transporting oranges to permit the air vents to remain open until the outside temperature falls to 25° F. Consequently, oranges loaded in the warm California weather are now successfully marketed during winter months without the expense of icing.

Hundreds of additional research projects could be described. Those cited are merely samples of new discoveries that are stimulating hope for more abundant crop production through an integrated application of scientific knowledge regarding plants, soils, and agricultural engineering.

REVOLUTIONARY PROGRESS IN INSECT CONTROL

Tremendous progress has been made in the development of insect-control measures in recent years. Along with these developments has come an increased interest in insect control. Many people are beginning to realize that it is no longer necessary to put up with flies, mosquitoes, and other pests that annoy man and carry disease, or to continue suffering the heavy economic losses caused by the multitude of insect pests that attack growing crops, forests, livestock, and all agricultural products. Research has provided better tools and methods than were ever before available for combatting these pests, and is continuing to improve on them. The preliminary results obtained with some of these new control measures have been so outstanding that it is not too difficult to believe that eventually it may be possible to bring about actual freedom from some of our worst insect enemies.

Many new and amazingly effective insecticidal materials are under test or have come into use during the past few years. DDT is perhaps the best known example. Benzene hexachloride, chlordane and chlorinated camphene are other chlorinated hydrocarbons which have been found to have insecticidal value and which have already come into use for the control of certain pests. Outstanding among a number of organic phosphorus compounds still largely in the experimental stage that have shown much promise, especially for the control of aphids and mites, are tetraethyl pyrophosphate and parathion. Many materials, including those mentioned above, that have been found to be most efficient in killing insects are also toxic to mankind and to other animals.

Some chemicals, or the various accessory materials that must be used with them in the formulation of insecticides may, if used under certain conditions, have an adverse effect on plant life or even on soils. Thus, the development of satisfactory insecticides to the point where they may safely be recommended for use by the laymen involves many and complex problems. Intensive and carefully planned research, under a wide variety of conditions and often over long periods of time, is therefore necessary before any new insecticide can be recommended for a given use.

Synthetic Organic Compounds

Much interest has also developed in the use of synthetic organic compounds in combination with insecticides derived from plants, such as pyrethrum, rotenone, and nicotine. For example, the pyrethrins, which are the active principles of pyrethrum, have a rapid paralytic effect on insects and are nontoxic to warm-blooded animals. They are, however, rather expensive, so replacement of part of the pyrethrins with cheaper materials which may or may not have insecticidal properties in themselves permits a more economical use of pyrethrum. Some materials, such as sesamin, piperonyl cyclonene, and piperonyl butoxide, when used in this manner increase the toxicity of the pyrethrins and are referred to as synergists, or activators. In some instances these synergistic mixtures have the added advantage of being more persistent in toxic action than either material used alone.

No one insecticide yet discovered is highly effective in killing all kinds of insects. However, a distinct advantage of some of the recently developed materials over those that have long been in use as insecticides lies in the fact that in many instances much smaller quantities give equal or better control of certain pests.

Furthermore, a number of new materials have a long residual action, thus enabling equal or better control of the insects with fewer and less frequent applications. The trend therefore is toward the use of much smaller amounts of toxicant and fewer applications.

The control of livestock pests offers a good example of the benefits that may result from use of these new materials. Spraying of cattle with small amounts of DDT effectively controls hornflies and will also control or reduce infestations of other external parasites such as lice and ticks. Because of its long residual action, the insecticide continues to kill the pests over a considerable period of time, thus reducing the frequency of required applications. With this material cattle owners now have practical means of combatting these livestock pests, and through cooperative community action, it may even eventually become possible to eliminate some from given areas.

Development of the new insecticidal materials has been accompanied by drastic changes in methods and equipment for applying insecticides. Various types of mist blowers have been developed whereby the toxic materials in concentrated mixtures are dispersed in the form of finely atomized mists that cover large surfaces with low volumes of liquid. Nozzles of various types are used to introduce the finely atomized spray into the air blast of a power blower as the air leaves the blower. The low gallonage of liquid required with these concentrates has also made practical the use of aircraft for applying insecticides in liquid form. The use of the airplane for applying sprays makes possible the treatment of many types of areas hitherto inaccessible or too extensive for rapid coverage with ground equipment, such as certain mosquito-breeding areas, mountainous forest terrain, or extensive acreage of a given crop.

This development, together with the persistent killing action of some of the new materials, now makes possible the control of some highly injurious pests that could not be satisfactorily controlled with the materials, methods, and equipment previously available. Successful control of a destructive outbreak of the Douglas-fir tussock moth over an extensive mountainous forest area in the Northwest has already been accomplished through the application of DDT sprays from airplanes. Great progress is also being made in control of the gypsy moth and other forest pests with the use of residual sprays applied with airplanes and various new types of ground equipment.

Development of Aerosols

Another important advance in the field of insecticide application is development of the use of insecticidal aerosols. This principle first came into use during World War II for protecting the armed forces against malaria-carrying mosquitoes. It has since come into general use against household and greenhouse pests. Use of some of the newer insecticides in aerosols is giving outstanding results in the control of thrips, certain aphids, mites, and other pests which have previously been extremely difficult and costly to control in greenhouses. The aerosol method is also coming into widespread use to control the pea aphid and other pests in commercial plantings. The light weight of the equipment required and the speed with which the treatment may be applied are only some of the advantages of this method.

In recent years there has been a definite trend toward more widespread application of the principle of cooperative coordinated effort in insect control. This is typified by the grasshopper-control program that has been under way for some time. In this work the Department cooperates with State and county agencies in a number of

Midwestern and Western States where grasshopper infestations that develop over large areas are a serious threat to crop and pasture lands. Farmers, ranchers, and other private individuals also participate in the program. Surveys are conducted by Federal and State agencies to determine areas where threatening infestations will develop or are likely to occur. Bait materials are furnished without cost by the Federal Government. The cooperating counties store them, mix them into the form of wet bait, and issue them to the farmers who use them. Baiting of roadsides, lands under Federal jurisdiction, and other public lands is done by Federal agencies. Results of this cooperative control program result each year in large savings for each dollar expended.

An extension of this principle to protect natural resources in forests is brought about by the recently enacted Forest Pest Control Act. This provides authority whereby the Government can cooperate with State and private owners to protect forests on lands under their ownership from injurious insect pests or diseases. Such cooperative coordinated effort is essential in the satisfactory control of many insect pests.

Plants That Resist Insects

The development of plant varieties resistant to insect attack is another field of endeavor that holds considerable promise for the control of some insect pests. Entomologists have found that certain varieties of some staple crops are resistant to insects or may be unattractive to them. Work is under way in conjunction with plant breeders to utilize this varietal resistance. This includes investigations on the resistance of wheat and barley to the hessian fly, sorghum and corn to the chinch bug, small grains to the greenbug, sugarcane to the sugarcane borer, corn to the European corn borer and the corn earworm, alfalfa to the pea aphid, and strains of cotton to the cotton aphid. Some resistant varieties of wheat, corn, and sugarcane have already been released and are being used extensively by growers.

SCIENCE IN LIVESTOCK PRODUCTION

The joint efforts of Mexican and United States forces to suppress the outbreak of foot-and-mouth disease in Mexico, reported last year, continued. The infection is still present over a large area in central Mexico but the former general spread of the disease has been halted. Also, the total size of the quarantined area has been reduced about a tenth since January 1948 through three relocations of the northern quarantine line in a southerly direction.

Methods currently used for combating the disease in Mexico differ greatly from those applied early in the outbreak. The change, made at the request of Mexican officials, provides for the vaccination of the healthy susceptible animals within the quarantined area. The purpose of such vaccination is to build up, among susceptible animals, resistance to the disease and thus reduce its ability to spread. Slaughter and burial of affected and exposed animals are resorted to only when the disease appears near to or beyond the quarantine lines. Formerly slaughtering operations constituted the principal attack against the disease, so much so that the country could no longer withstand the shock of the original plan to slaughter all affected and exposed animals, in the hope of eradicating the disease quickly. Other important operations, including inspections, disinfection, and enforcement of quarantines, are being continued on a large scale.

The strategy described has been definitely effective in preventing foot-and-mouth disease from spreading to northern Mexico, the United States, and Central American countries.

Although public interest in the exclusion of this foreign livestock plague from the United States has centered largely on the situation in Mexico, the Department is well aware that there is danger, also, from many other countries where foot-and-mouth disease exists. Increasing air-borne commerce accentuates the chance that the virus may enter in spite of the numerous precautions taken. To enable the United States better to meet these dangers as well as unforeseen situations, the Department asked Congress, during the year, for authority to conduct research on foot-and-mouth disease. Legislation approved April 24, 1948, was in response to this request. Plans for scientific investigations to provide the additional knowledge needed for combating the disease most effectively are now well advanced.

Purebred-Livestock Importations Again Break Record

For the third successive year the number of purebred domestic animals certified for entry into the United States duty-free, for breeding purposes, exceeded those of the previous year by a substantial number. During the year ended June 30, 1948, the number of animals so certified was 42,537. Extensive importations of purebred breeding stock from various foreign countries have been useful in the improvement of the Nation's livestock industry.

Of the animals certified for entry last year more than three-fourths were cattle, with sheep, swine, and horses, in the order named, accounting for most of the remainder. As in the past, the importations originated largely in Canada but considerable numbers of some species of animals came also from countries in Europe, Asia, and South America. A few sheep came from as far as Australia.

The presence of animal diseases in various parts of the world has a limiting effect on importations, since the United States has rigid sanitary import restrictions for protecting its valuable livestock industry. In addition to those requirements, the basis on which the Department certifies purebred animals for importation is whether they are acceptable specimens of recognized breeds whose sponsoring associations have furnished the Department with books of record.

"X Disease" of Cattle Is Baffling Malady

During the year a baffling cattle malady known thus far as "X disease," "double X disease," and by several other names, became the object of study by cooperating Federal and State livestock scientists. Some veterinary pathologists have called the disease hyperkeratosis because one symptom is a marked thickening of the animals' skins.

Reports received by the Department show that the disease has caused serious losses in at least 26 States and that it poses a serious threat to the efficient production of meat, milk, and other animal products. The disease has not yet been shown to be infectious since attempts to transmit it experimentally have been unsuccessful. Numerous drug treatments have also failed. As observed thus far, the disease has a normal course of from several weeks to 3 months or more. Young stock appear to be more susceptible than adults. Severly affected animals usually die.

Early symptoms include a watery discharge from the eyes and nose. As the disease progresses, there is loss of condition; the victim becomes depressed; and a progressive thickening of the skin occurs. In many cases, wartlike elevations and ulcers are present in the mouth. Diarrhea sometimes occurs, most commonly in the late stages of the disease. To obtain possible leads for an attack on the disease through research, the Department developed plans for a field survey by a group of workers skilled in several branches of science. Results of the study, which is still in progress, will be announced promptly on completion.

Kidney Worms Found in Midwestern Hogs

The swine kidney worm, a common parasite of swine raised in the Southern States and formerly confined largely to that area, is now affecting midwestern hogs. Though known as the kidney worm and causing injury to that organ, the parasite also migrates to the liver, where it inflicts its principal damage from the standpoint of the economic loss.

During the year, examinations were made of about 1,000 hog livers from hogs originating in Midwestern States. Approximately 19 percent of the livers showed injuries caused by that parasite, indicating that it apparently has become prevalent in the Middle West.

Danger to Animals From Infected Instruments

When properly used, hypodermic syringes, bleeding needles, and other instruments are valuable aids in the control of livestock diseases; but the same instruments, if contaminated, may spread some diseases. A similar danger applies to instruments used for dehorning, tattooing, castration, and the like, when blood is drawn.

Last year the Department issued two timely public warnings of this nature. One concerned the horse disease infectious anemia, or swamp fever, which involved hundreds of race horses at several tracks in New England. Investigation by Department veterinarians indicated that the use of infected instruments was an important factor in the spread of this disease. Even a very small amount of blood can transmit the infection. Animals having the acute form of the disease seldon live over 15 to 30 days. Those having the chronic form, which is more common, are subject to intermittent attacks of fever and weakness for years. No dependable cure or preventive vaccine is known.

The second warning concerned the cattle disease anaplasmosis, which can be spread in the same manner. Reports of serious losses from anaplasmosis, mostly in Southern and South Central States, led to a meeting by Department and State officials who emphasized the danger of the mechanical transmission of the disease by inoculations, bleeding, dehorning, and other operations. In all such procedures, only sterilized instruments should be used, and if several animals are to be treated, each instrument should be sterilized before its reuse.

Federal Meat Inspection Renders Broad Service

The Department's Federal Meat Inspection Service is required by law at all slaughtering and meat-packing plants engaged in interstate or foreign business. Last year it was conducted at 1,031 establishments in 387 cities and towns. Its inspectors examined more than 86½ million food animals both before and after slaughter. Over 300,000 of this number failed to pass inspection and were condemned under official supervision.

A feature of the service rarely seen by the public is the operation of seven meat-inspection laboratories where samples of products, curing ingredients, condiments, and other substances are examined. Last year about 24,000 samples underwent such tests, and more than 2,000 were rejected because of adulteration, unfitness for food, or other reasons.

More than 18,000 new trade labels and sketches received approval for use on inspected meat products but nearly 10 percent of the number failed to comply with labeling requirements and were disapproved. The total quantity of meat and meat byproducts processed under official supervision exceeded 12½ billion pounds. As evidence of inspection, all federally inspected meat bears stamps or labels showing it to have been "U.S. Inspected and Passed" by the Department of Agriculture. The most common are the round purple stamps on fresh meat and printed statements of inspection on packaged goods.

Tuberculosis and Brucellosis

In spite of the success of earlier efforts that reduced the extent of bovine tuberculosis in all States to a small fraction of 1 percent, sporadic outbreaks still occur. These demonstrate the importance of retesting herds at least every few years so as to detect and remove any infection that may have developed since the previous test. As a further precautionary measure Department veterinary officials have developed a system of tracing, to herd origin, any animals that disclose signs of tuberculosis when slaughtered under Federal meat inspection. This system is used largely in areas where livestock are concentrated or where other conditions favor the spread of the disease.

The inspection records provide evidence on conditions found during post-mortem examination, but there is still need for improvement in establishing more complete sales records on all slaughter animals, together with means of identification. In these final measures to stamp out the disease, the cooperation of all branches of the livestock industry concerned with marketing cattle is highly desirable. When the chain of records has been complete, inspectors have been able to trace tuberculous cattle quickly to the herd and farm from which they came and sometimes even to certain pastures. Further eradication work is then conducted.

At the end of the fiscal year more than 6,000,000 herds, containing over 66,000,000 cattle, were under Federal and State supervision for the eradication of bovine tuberculosis. The average degree of infection found, by tuberculin testing, was 0.19 percent, which is slightly less than that of the two previous years.

The eradication of bovine brucellosis, or Bang's disease, is a companion project to the campaign against tuberculosis. Both are conducted largely by the same field organization and both involve similar Federal and State cooperation.

At the end of the fiscal year approximately 2,292,000 herds, containing about 18,130,000 cattle, were under Federal and State supervision for the eradication of brucellosis and about 3,000,000 more cattle were on the waiting list to be tested. Also at the end of the year a total of 480 counties throughout the country had qualified as areas officially accredited because of their satisfactory progress toward the eradication of the disease.

The demand for vaccination of calves against brucellosis continues to increase, as owners realize the benefits from raising healthy, disease-resistant calves. Since vaccination became part of the Federal-State brucellosis program in 1941 about 4 million calves have been vaccinated of which more than a fourth received this treatment during the last year.

Unfortunately both the tuberculosis and brucellosis projects have been hampered by a lack of available veterinarians. A further adverse influence, accented by high prices for beef and milk, is the tendency of farmers to bring cows of uncertain origin into clean herds. Plans are now in progress to bring the realization of this danger forcefully to the attention of cattle owners. For disease-eradication programs to make the desired progress, it is necessary that infected animals be located and preferably destroyed—at least they must be prevented from moving in regular channels of trade.

Remount Service Transferred to USDA

Under Public Law 494, the Remount Service of the Department of the Army was transferred to the Department of Agriculture, effective July 1, 1948. The service originally derived its name from its function of supplying fresh horses for the Cavalry. Subsequently it comprised horse-breeding operations, with a view of improving types of horses for Army use; but with increasing mechanization of the Army, its need for horses decreased. The order transferring this service specified that it be administered to "advance the livestock and agricultural interests of the United States, including improvement in the breeding of horses suited to the need of the United States."

As acquired by the Department, the Remount Service consisted of several breeding establishments in different parts of the country, together with personnel, horses, property, and records. Plans are now being made to fit operations at these establishments into the livestock-research program of the Department.

Investigations Under the Research and Marketing Act

The Research and Marketing Act of 1946 has enabled the Department to increase its studies of livestock and poultry. In the selection of projects, Department and cooperating State research workers have had the benefit of suggestions from the Department's Livestock Advisory Committee, whose members represent various agricultural groups.

One new livestock-research project now under way consists in exploring ways of producing high-quality beef most economically. In this study Federal and State investigators are endeavoring to develop lines of beef cattle that will consistently produce calves that excel in rapid growth, quality of meat, and efficiency in use of feed. A related line of study involves the resistance of beef cattle to extremes of heat and cold.

Another project, under the same act, is directed toward ways of preventing deterioration in the quality of poultry, meat, and eggs. This project deals also with new and improved uses for poultry and egg byproducts.

In poultry-breeding research the investigators are endeavoring to learn whether hybridization will produce the same improvements among animals that it has for plants, such as hybrid corn. Using chickens as experimental animals, the scientists are combining inbred lines in the expectation of producing hybrids that are superior to other chickens in fecundity, growth rate, livability, and carcass quality.

Work of the foregoing kind is unlikely to yield the desired results for several years but is mentioned here as a promising approach to the solution of several problems bearing on the Nation's food supply.

Meat-Storage Study Conducted for Army

The Department's meat specialists cooperated with the procurement officers of the War Department in studying factors that affect the keeping quality of mildly cured, sliced, vacuum-packed bacon. The experiments, involving many different tests, showed that a reduction of the moisture-salt ratio to 5:1 or less would improve the keeping quality of the product. The basis for judging quality of the bacon was a shelf life of at least 3 months at 100° F.

The studies included tests of the ability of 51 strains of microorganisms commonly found in bacon to cause fermentation. These determinations, which were positive in most cases, provided an explanation for the marked tendency of cans of mildly cured, sliced, vacuum-packed bacon to swell during storage.

Improvement in Navajo Sheep

For many years the Department of Agriculture has been cooperating with the Interior Department in the improvement of the sheep of Navajo Indians. This project is essentially an effort to help the Indians on the Navajo Reservation in Arizona and New Mexico obtain a better living from their sheep that must subsist on desert ranges.

Because of their sparse forage, these ranges can support only limited numbers of sheep. The chief problem is to increase the wool production per animal while still maintaining the quality of fiber suitable for weaving into Navajo rugs, blankets, and other native goods. Success in this effort is shown by an average yield, by yearling Navajo ewes, last year, of 3.52 pounds of clean, scoured wool of acceptable quality. This represents a gain of 58 percent over the production of foundation Navajo ewes a decade ago.

Estrus in Ewes and Does Controlled by Light

Research in the Department has shown that length of day affects the flowering of plants. This discovery has had many practical applications. Studies by the Bureau of Animal Industry indicate that the same principle, known as photoperiodism, may be useful in the breeding of sheep and goats. These animals have limited breeding seasons, commonly in the fall and early winter, and since the gestation period is about 5 months, the young are born in the spring. Hence the milk supply from goats and the production of market lambs are ordinarily restricted to only parts of the year.

To obtain more complete and exact information on the reproduction of these animals, Department scientists subjected them to varying periods of light. For instance during April, May, and June, when the days are quite long, some of the ewes and does used in the experiment received only 6 hours of light a day. Most of the animals subjected to this control had one or more estrus cycles (periods of heat) during the 3 months, signifying their ability to breed. Other animals not under light control did not show estrus. These results, though preliminary, indicate the feasibility of extending the breeding season of sheep and goats, and thereby increasing the period for profitable yields of goat milk and market lambs.

Fur From Poultry Waste

In the production of mink, horse meat has been a common food in the past but, for economic reasons, a less expensive and more dependable source of meat for the feeding of mink is desirable.

Poultry waste, such as chicken heads, feet, and entrails, is a promising solution to this need. When fed to weaned mink kits, as about a third of their diet from 49 days of age to pelting, such poultry waste, fed raw, produced more rapid growth than an equal proportion of horse meat. Poultry waste proved also to be fully as satisfactory as horse meat for the maintenance of adult mink during the summer and fall months. Additional studies are needed to determine the relation between such feed and the quality of pelts obtained.

A similar search for food to replace horse meat in the diet of growing foxes revealed that the use of hatchery eggs in the diet produced unusually fine fur. Such eggs are a byproduct of the hatchery industry, being candled out in the course of incubation. Other foods, tested with variable effects on the condition of the animals and fur production, were tripe, udders, lungs, and blood. These studies open up a promising new field of opportunity in the economical feeding of fur animals raised in captivity.

RESEARCH AND EXPERIMENT WITH DAIRY CATTLE

The high average milk and butterfat production in the Bureau of Dairy Industry experimental herds at Beltsville, for a decade or more, affords a continuous demonstration of the effectiveness of the proved-sire system of breeding.

Butterfat production both in the Jersey herd and in the Holstein herd at Beltsville is now about 200 pounds higher per cow per year than the average of the foundation cows.

Further evidence that the proved-sire system is effective in improving dairy herds is the performance of the sons of proved sires in farm herds. At the Huntley, Mont., station, where proved sires have been used continuously in the experimental herd, 96 sons which were loaned to cooperating farmers sired 1,106 daughters that averaged 11,471 pounds of milk and 412 pounds of fat—an average increase over their dams of 905 pounds of milk and 36 pounds of buttterfat.

Cross-breeding experiments, involving the Holstein, Jersey, Red Dane, and Guernsey breeds, were begun in 1939 by the Bureau of Dairy Industry to explore the possibilities of cross breeding as a means of improving milk and butterfat production in the farm herds. Production records are now available for 50 two-breed cows, and for 27 three-breed cows.

The average production of the two-breed cows was 12,958 pounds of milk and 586 pounds of butterfat, an average increase over their straight-bred dams of 2,705 pounds of milk and 141 pounds of butterfat per cow. The three-breed cows averaged 13,130 pounds of milk and 618 pounds of fat, an average increase over their two-breed dams of 14 pounds of butter fat and a decrease of 35 pounds in milk yield.

These results indicate that a high level of production may be reached in less time by a cross-breeding program than by straight breeding. The commercial application of this program is in the use of superior sires in artificial-breeding associations by dairymen with high-grade herds, to obtain crossbred replacements for their herds and to get the benefit of hybrid vigor.

Dairy Cattle Nutrition and Feeding Studies

It is estimated that pastures contribute more than one-third of all the feed consumed by livestock in the United States and that more than one-third of the feed furnished by pastures is utilized by dairy cattle. Although pastures are an important source of feed for dairy cattle, they are often the most neglected of all crops grown on the farm.

Experiments by the Bureau of Dairy Industry, in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering, show that unproductive permanent pastures can be improved considerably by renovation. The renovation process consists of applying manure, lime, and commercial fertilizer; disking thoroughly; and seeding with an approved pasture mixture. Yields from renovated pastures over a 3-year period averaged 41 percent more (dry-matter basis) than the average from similar permanent pastures that received the same fertilizer treatment but were not disked or reseeded.

A 5-year crop-and-pasture rotation experiment begun at Beltsville in 1943 indicates that more roughage and more total digestible nutrients can be obtained from this rotation system than from permanent pastures. Corn and wheat are grown the first 2 years, and grasses and legumes the following 3 years. Surplus forage is made into hay or silage. On the average, this rotation has yielded 16 percent more nutrients per acre than permanent pasture. Furthermore, the crops in the rotation series provide grazing in early spring and late fall, when normal amounts of pasturage usually are short.

Experiments with modern methods of harvesting and preserving the hay crops show that much more of the carotene (provitamin A) in the standing crop can be saved by making "grass" silage or barn-dried hay than by making field-cured hay.

Inasmuch as forages harvested as wilted silage and barn-dried hay are not exposed to the sun as long as field-cured hay, it has generally been assumed that these feeds contain little if any vitamin D. However, experiments by the Bureau of Dairy Industry show that forages harvested by any of the three methods provide enough vitamin D for calves when fed in proper amounts. More recent experiments show that dead leaves and stems, and leaves that become yellow from insect injury are the source of the vitamin D in fresh-cut forages.

In cooperation with the North Carolina Agricultural Experiment Station, the Bureau of Dairy Industry is determining the feeding value of new feedstuffs produced from vegetable and animal wastes or byproducts, generally available to dairymen in the Southeast. A byproduct ration made up of dried citrus pulp, dried sweetpotatoes, peanut meal, and cottonseed meal gave approximately the same milk production as a standard ration of corn, oats, wheat bran, and cottonseed meal, when both rations were fed with the same type of roughage and at the same rate.

Preliminary results by the Bureau of Dairy Industry indicate that some cows can maintain themselves and produce milk on less protein than has been considered necessary. Cows that were fed a low-protein ration maintained as high a level of production as those fed a medium- or high-protein ration. Furthermore, prolonged feeding of the low-protein ration did not decrease fat production.

Other experiments dealing with nutrition of calves show that colostrum milk, a highly concentrated feed essential for proper nourishment of new-born calves, can be fed safely to older calves when it is diluted with warm water in the proper proportion. The complete utilization of valuable colostrum milk will channel more whole milk to the markets.

Bureau of Dairy Industry research reveals that growing calves will eat more hay when they have free access to it all day than when it is fed several times a day. Depending on the breed, the consumption with free feeding ranged from 25 to 39 percent higher.

Artificial dehydration of forage crops saves more dry matter, protein, and carotene than making "grass" silage, barn-dried hay, or field-cured hay. Labor and equipment requirements are higher, however, and the rate of handling the crop is slower. Wilting the crop before dehydrating it decreases the fuel requirements and increases the capacity of the dehydrator.

Feeding trials showed that the dehydrated forage was palatable to dairy cows and that it was equal in feeding value to forages of good quality produced by the three above-mentioned methods. It was superior to poor-quality field-cured hay.

Little information is available on how much sugar is lost from forage crops during harvest, especially under adverse weather conditions, because of the long and tedious method involved in making sugar determinations. Bureau of Dairy Industry scientists have modified the sugar-analysis procedure used by the Association of Official Agricultural Chemists, principally by eliminating the clarification process. This shortens the time necessary for conducting the analyses from several hours to a few minutes. The test has been applied to grasses and legumes commonly made into hay.

Results of studies on barn-dried hay by the Bureau of Dairy Industry, Bureau of Plant Industry, Soils, and Agricultural Engineering indicate that the most feed nutrients are preserved and the best quality hay produced by drying to a safe moisture content within a week or less time. The use of supplemental heat reduces both the drying time and the amount of electricity required to about one-third of that used in drying similar hays with unheated air.

Dairy-Products Research

The improved phosphatase test devised by the Bureau of Dairy Industry, for determining whether milk used in various products has been pasteurized properly, has now been adopted by the Association of Official Agricultural Chemists as the official method for some milk products, and as a tentative method for others. The older tests for pasteurization have been discarded.

Seeking methods to increase the synthetic production of riboflavin (vitamin B_2) by growing certain bacterial organisms in whey, the Bureau of Dairy Industry obtained 300 milligrams of riboflavin from a liter of whey by using the organism *Ashbya gossypii.* Studies this year indicate that a mild acid hydrolysis of the constituents of whey, in addition to producing glucose and galactose, releases reducing substances in sufficient quantity to furnish a source of carbon and a set of conditions in which larger quantities of riboflavin are produced than can be obtained from an equivalent mixture of whey, glucose, and galactose. The composition of these reducing substances is not known as yet.

In a long-time study to determine why sweetened condensed milk thickens with age in storage, one phase of the Bureau's research showed that milk forewarmed to a temperature considerably higher than boiling produced a product of lower viscosity than the customary forewarming procedure. Milk forewarmed in the usual way to about 180° F. for 10 minutes produced a milk with a viscosity 10 times greater than milk that was forewarmed at 240° F. for 30 seconds. After 124 days' storage at 60° F. the milk forewarmed in the usual manner showed a heavy gel structure, whereas the milk forewarmed at the higher temperature had a lower viscosity and flowed smoothly.

The crystalline deposit which develops in some samples of evaporated milk during storage is largely calcium citrate. The crystals are harmless but nevertheless objectionable to some consumers, especially if the milk is to be used for infant feeding.

Dairy scientists found that when crystals do develop, they make their maximum growth between the first and second year of storage. They seldom appear during the first 6 months of storage. Experiments showed that agitation of the cans during early storage may accelerate growth, and that holding the milk at cool temperatures rather than at room temperatures or above retards growth.

Research workers in the Bureau of Dairy Industry are using ascorbic acid (vitamin C) in an attempt to retard the development of an oxidized flavor in frozen milk. Results showed that a strong oxidized flavor was present in thawed milk when only small amounts of acid had been added and that the flavor developed at a much slower rate when the milk had been heavily fortified with the acid. Deaeration aided in preserving the ascorbic acid, but was only slightly effective in retarding the onset of the flavor.

Research this year showed that the keeping quality of dried whole milk can be improved by heating the milk out of contact with air before it reaches the drier. When milk is heated, certain sulfur compounds are formed in the milk which act as antioxidants, delaying the development of the tallowy flavor, a common defect in dried whole milk. Current research showed further that the concentration of the sulphydryl groups is increased when milk is first deaerated and then heated out of contact with air.

In one phase of research aimed at increasing the uses of nonfat solids in human foods, the Bureau of Dairy Industry found that a highly dispersible protein product containing about 71 percent protein could be obtained from dried milks by precipitation with methanol. The treatment is successful both at below-freezing and room temperatures, the protein product is readily dispersible in water when heated, and samples have retained their stability for over a year.

Bacteriologists in the Bureau of Dairy Industry, after studying the milk from mastitis-infected cows in the Beltsville herd for 3 years, report that the causal organisms differ somewhat from the usual conception of mastitis infections.

Streptococcus agalactiae, usually considered the predominating cause of mastitis, was found in only about 10 percent of infections; whereas the predominating organisms were *S. uberia* (30 percent) and hemolytic staphylococci (37 percent), with a fairly high percentage of pseudomonades (9 percent). Among the organisms identified in mastitic milk were streptococci (five species), hemolytic staphylococci, pseudomonades, yeasts, and coliform bacteria.

The Bureau also found that good management and penicillin had helped to keep mastitis under control in the experimental herds at Beltsville during the past 3 years. After determining adequate dosages of penicillin, the research workers were successful in eliminating the infecting organisms from 88 percent of the mastitis cases detected in the herd. Penicillin has proved more effective than the various forms of sulfa drugs used previously.

Milk Sugar

Successful alcoholic fermentation of the lactose, or milk sugar, in whey has been perfected by the Bureau of Dairy Industry. Whey, a byproduct of cheese and casein manufacturing plants, is a cheap source of fermentable sugar when sufficient whey supplies are available. Furthermore, the disposal of waste whey offers difficulties in stream pollution. Before the war the Bureau scientists demonstrated that alcohol could be produced from whey. Subsequently they sought yeast strains that would do the fermenting more efficiently, and they tested a large and varied collection of lactose-fermenting yeasts. One of the yeasts, *Torula cremoris*, did a complete job of fermenting in 55 hours. It proved far superior to any competitor among the yeasts under observation. In pilot-plant trials yields of ethyl alcohol averaged 84 percent, as compared with nearly 91 percent in the laboratory.

SCIENTIFIC DISCOVERIES AT THE EXPERIMENT STATIONS

This Department administers acts of Congress that authorize research appropriations for the State agricultural experiment stations. Through its Office of Experiment Stations it suggests projects; helps to plan and coordinate State research among the stations and with Federal agricultural research; sees that the use of Federal-grant funds obeys the legislation; and reports as to accomplishments. Following are some results reported during 1947–48.

Known as Palmetto, a new cucumber, released by the South Carolina station, in one commercial-planting trial last fall had an average value of well over $1,000 per acre, where present varieties barely paid the cost of production. The secret of success with this new cucumber lies in its resistance to the downy mildew disease that so frequently causes failure of fall cucumber crops in the South. All available seed for 1948 was allotted to seedsmen who supply South Carolina farmers; these companies are to grow Palmetto cucumber seed in California for supplying contracts with growers for production in the fall. Results at the Clemson truck station have been checked by several other southern experiment station workers in spring-crop tests; in each case where downy mildew was prevalent, Palmetto continued to produce even after other varieties had been ruined by the disease.

Progress Against Pests, Diseases, Weather Hazards, Etc.

Apples have been thinned satisfactorily by sprays of sodium dinitrocresylate (Elgetol 30) in Idaho station experiments, with little or no reduction in yields compared with hand thinning and at the same time with increases in the size of individual fruits. Trees thinned by sprays in 1946 also gave substantial yield increases in 1947 over trees hand-thinned or not thinned in 1946. The results indicate spray-thinning only for conditions normally giving a heavy set of fruit. The time to spray is as soon as a few petals will fall when a branch on the southwest side of the tree is shaken lightly, but not before 90 percent full bloom. Best results have been obtained on Delicious and Rome Beauty apples with 1¼ pints of Elgetol 30 per 100 gallons of spray, on Jonathan with 2 pints per 100 gallons, and on Winesap with 1 pint per 100 gallons. A number of growers who have used the blossom-thinning sprays on a commercial scale have reported satisfactory results and substantial savings in the cost of the operation. One grower estimated a saving of $7,000 in thinning costs on 120 acres of orchard.

Ohio WR Globe, a new variety of tomato developed by the Ohio station, provides greenhouse growers with an acceptable tomato resistant to the common race of fusarium wilt. This new tomato—the result of an intensive breeding program—includes in its parentage a strain of the wild tomato (*Lycopersicon pimpinellifolium*) from which it obtains its wilt-resistant qualities. Ohio WR Globe is a pink-fruited variety with very good market quality. In greenhouse-yield tests in the Cleveland producing area it surpassed Globe Strain A by about 6 percent. The new variety has a slight tendency to crack, but not seriously. A considerable amount of seed should be available for the 1949 growing season.

Damage to Michigan crops each year by frost amounts to 10 to 20 million dollars. Attempts have been made in the past to prevent such damage through the use of smudge pots, motor-driven fans, airplanes, and helicopters; all of these methods, however, have proved expensive and not very successful. An infrared radiant-type frost-damage-prevention apparatus has been developed by the Michigan station which appears to be practical, positive, and relatively inexpensive. This device has been under test for the past 2 years and its effectiveness has been demonstrated in tests with frost-sensitive plants. One unit, burning approximately 10 gallons of oil an hour, protects about an acre of vegetation from moderate frosts when used in groups of units. Although the apparatus is in the experimental stage and its effectiveness still needs to be tested on many types of vegetation, the promising results already obtained are even now leading to commercial development and manufacture.

Findings in Weed Control

The usefulness of the synthetic chemical 2,4-D may be greatly extended if preliminary results of experiments at the Louisiana station are confirmed. This substance, 2,4 dichlorophenoxyacetic acid in its various compounds, has proved amazingly effective at great dilution for controlling many pestiferous agricultural weeds. A scientist at the Louisiana station has found that the dilute chemical applied in various ways—and even its fumes alone—will greatly reduce the common and destructive green-mold rot of citrus fruits caused by the fungus *Penicillium digitatum.* It now remains for future experimentation to determine how far this inexpensive chemical may be employed in the practical economic control of the many rots, blights, mildews, wilts, and other disorders of additional farm crops. In fact, some evidence is at hand that just as 2,4-D will not destroy all kinds of plants, it may well prove "selective" as to the fungi which it will hold in check. At any rate, 2,4-D appears to be specific against the green-mold rot of citrus.

Experiment station workers have reported considerable difficulty in the destruction of thistles in pastures of the northeastern United States by use of the same 2,4-D preparations as have proved so effective against many other kinds of weeds. The Rhode Island station, however, obtained successful control with 3 different compounds of 2,4-D at the rate of 1 : 1000 when applied during the time the thistles were in the rosette stage or before the stem had stopped elongating. Even when employed after the flowers had developed, a triethanol amino salt of 2,4-D was still effective at this same concentration. It thus appears that with the right formulation and correct dilution of 2,4-D used at the proper time these troublesome pasture weeds can be eradicated if the material can be applied without too much labor as a "spot" spray on individual plants over fairly large areas.

Quack grass, one of the most troublesome weeds, can now be controlled by ammonium thiocyanate, a byproduct of gas manufacture, as a result of research by the New York (Cornell) station. Ammonium thiocyanate kills all the vegetation it contacts and also acts as a soil fertilizer and sterilizer. As a result of this double action, when applied at the time of fall plowing, it will wipe out quackgrass and other perennial weeds and at the same time increase the soil fertility. The toxic effect of the chemical in the soil lasts for at least 3 months, during which time crops cannot be planted. To clear up this point the station planted test crops in soil samples in February, following July application of the chemical at 400 gallons per acre, and obtained normal growth of beans, oats, and other crops. In 1947, following treatments during the summer and fall of 1946, only annual weeds appeared, thus indicating that the soil was free from the toxic effect of the chemical; perennial weeds, such as quackgrass and chrysanthemum weeds had been eliminated.

Results from Ithaca and Long Island point to the feasibility of eradicating dense infestations of perennial weeds by fall treatment followed by spring planting. Subsequent control of annual weeds can then be followed along conventional lines or by established preemergence methods. Ammonium thiocyanate is too expensive to use as a fertilizer alone, but is valuable as a combination fertilizer-weed killer. Four hundred gallons of the solution are equivalent to about 1,200 pounds of ammonium nitrate per acre. The use of ammonium thiocyanate is valuable primarily for cleaning up land heavily infested with quackgrass, chrysanthemum weeds, and other troublesome perennials. The soil is unfit for immediate planting, but fall treatments offer the possibility of sowing crops the following spring and of eliminating the necessity of fighting perennial weeds for one or more seasons.

Studies of Soil Treatment

Long-time studies of cropping and soil treatment by the Illinois station on the Morrow field plots established in 1876 have been used to compare the productive behavior of six 100-acre farms. Soil-management studies included corn continuously, and rotations of corn and oats and of corn, oats, and clover with and without chemical fertilizer treatment. Although each farm has remained physically a 100-acre farm, the one producing corn continuously without treatment has now become a 29-acre farm in terms of original productivity. The 100-acre farm producing corn, oats, and clover in rotation has become in effect a 132-acre farm. Where corn was grown continuously with soil treatment of chemical fertilizers, the 100-acre farm was equal to 71 acres in terms of original productivity. The above changes are based on the amount of crop income remaining after deducting labor, seed, harvesting, marketing, and soil-treatment costs.

A new type of hybrid corn for livestock has resulted from 7 years of research by the Connecticut State station. The new hybrids made by crossing superior field corn hybrids with a superior sweet corn inbred (C–95) have exceptionally large plants combined with high vigor. The green unhusked ears commonly weigh more than 2 pounds each and often exceeed a foot in length. One quarter of the kernels on these large ears are sweet; this seems to render the new hybrids more palatable to dairy cows than the ordinary silage varieties. Yield trials and farmer experience show them to be more productive than the field corn hybrids commonly grown in the area. Several of these sweet dent hybrids have compared favorably with U. S. 13 in standing ability. Analyses also indicate that the sweet dent silage at least equals U. S. 13 in feeding value. However, the high percentage of sweet kernels and the slow-drying ears make it undesirable to save these new hybrids for grain.

With the drainage of the Everglades, vast areas of this part of lower Florida were made available for planting. It was soon discovered, however, that crops would not thrive on these lands, and the Everglades branch of the Florida station was established to investigate the reasons for failure of the land to produce. Although many research findings and other factors have entered into the creation of the present vast food empire of the Everglades, the discovery by the station of the deficiencies in minor elements in the soils of the area and the development of methods of supplying them have been one of the most important factors. Now more than 72,000 acres are devoted to the production of vegetables, strawberries, and watermelons, and more than 30,000 acres of sugarcane are harvested annually, with a valuation in 1948 of some $7,061,000. Thousands of cattle are grazing on lush pastures in the Everglades today. Neither the cattle nor the pastures as they are today would have been possible had it not been for the use of minor elements on these soils.

Signs of declining soil fertility are appearing on many of the farms of South Dakota. One of the more noticeable soil changes caused by continuous cropping is a lack of enough available nitrogen for normal crop growth. At the State experiment station, nitrogen fertilizer increased the acre yields of wheat by 7 bushels. Nitrogen and phosphorous fertilizer together increased the yields by 11 bushels per acre in a 3-year rotation of corn-oats-wheat. Corn yields were increased by 9 bushels per acre through use of nitrogen and phosphorus. In a 3-year rotation of corn-wheat-sweetclover, the average yield of wheat was 31 bushels per acre as compared with 18 bushels for continuous wheat. In a wheat and sorghum rotation, the yield of wheat was increased by 3 bushels per acre by the application of nitrogenous fertilizer.

Livestock Investigations

A problem continually facing commercial producers of baby chicks is that of obtaining the maximum hatch. Sometimes as many as 50 percent of the eggs placed in incubators may fail to produce live chicks, and the loss is even higher with turkey eggs. The Wyoming station has increased the hatchability of chicken eggs approximately 18 percent by the introduction of additional oxygen into the incubator during the 3-week incubation period. Adding oxygen during the first and third weeks produced better hatches than adding it during the first and second weeks; moreover, adding it during the third week gave better hatches than when it was used only during the second week of incubation. The hatchability of turkey eggs was increased over 100 percent by the use of oxygen during the 28 days of incubation. Embryonic growth rate and hatching weight were not influenced, but the addition of oxygen to the incubators produced chicks with more vigor, longer down, and less stickiness than in chicks hatched in ordinary air. These results indicate that poor hatches at high elevations are actually due to oxygen starvation and that the situation could be improved by increasing the oxygen content of the air in the incubator.

The discovery of the Ohio station that satisfactory growth of chickens after the starting period (first 8 to 10 weeks) for either meat or egg production can be secured by feeding only whole corn and minerals (bonemeal, salt, and oystershell or limestone grit) when the chickens have access to Ladino clover range constitutes a major contribution to the economy of poultry and egg production. Moreover, preliminary reports indicate that satisfactory results may also be obtained from the corn-minerals ration or with slight modifications when the chickens have access to ordinary grass or run-of-the-farm pasturage. This incalculable saving in feed costs of poultry and egg production will in due time be reflected to consumers and the national economy as a whole.

Similar findings with dairy animals show that milk production can be maintained on a simple mixture of ground ear corn, soybean oil meal, salt, and minerals, when good-quality roughage is liberally fed. This is in keeping with good farming and soil conservation practices and should reduce markedly the expenditures for commercial dairy feeds.

Encountering serious troubles in perfecting rations and techniques for raising newborn pigs allowed colostrum for only the first 12 to 16 hours, the Arkansas station found that they do not tolerate sucrose as the carbohydrate. This sugar caused diarrhea, kidney damage, and death. Moreover, damage was not prevented by extra allowances of vitamins or by adding green-grass juice. Older pigs thrived on the sucrose ration, but when kidney damage from sucrose had resulted early in life, growth was subnormal. On the other hand, pigs started on synthetic diets containing glucose did very well. A pertinent suggestion is that sucrose evidently should be used with extreme caution as the carbohydrate in fortifying the milk ration for newborn animals or human infants until it can be learned whether the young of other species than the pig are also born without ability to digest sucrose in quantity.

Numerous short-time studies have shown the value of certain drugs such as thyroprotein for increasing the production of milk; however, various adverse effects have also occasionally been observed. Only through a long-time study can the true physiological picture be obtained. This type of work has now been carried out by the West Virginia station through an experiment in which Jersey and Holstein cows were maintained through the second and third years of thyroprotein feeding. Among the results were excessive loss in body weight and slowness in becoming pregnant. The appearance of cysts on the ovaries also seemed to follow a prolonged feeding of thyroprotein. Mastitis flare-ups occurred several times in the Jersey cows given the drug, and these particular animals were the only ones in the Jersey herd contracting the disease. As yet, no effect on the calves has been noted. This study—one of the few long-time thyroprotein-feeding experiments thus far reported upon—forcibly suggests that much remains yet to be learned before any large-scale feeding of this drug can be recommended to the dairy industry.

A new method of consistently producing breast cancer in female rats at the Alabama station may aid in throwing additional light on the problem of this malignant disease, which accounts for nearly a fifth of the total cancer cases in women. The station's research workers have produced breast cancer in every female rat fed a diet that included three hundredths of one percent 2-acetylaminofluorine. This discovery is unique because it is the first report of consistent production of experimental breast cancer in the rat. The method developed by these investigators provides a means for testing preventive and curative properties of various compounds or treatments, and puts another tool in the hands of research workers interested in the study of problems connected with cancer.

The Alabama workers, for example, are now engaged in testing certain vitamins and other nutritional substances to find out whether such factors will prevent or cure the breast cancer induced by a 2-acetylaminofluorine. That this compound would produce cancer was first discovered in 1941 by the United States Department of Agriculture. These workers were testing the effects of new insecticides on warm-blooded animals when they discovered that 2-acetylaminofluorine had cancer-producing properties. Their findings were later confirmed by others, both in this country and in England. The findings of the Alabama station, however, are exceptional because some of the other investigators have been able to produce only a few breast cancers with this compound, and none have produced them in more than 60 percent of the female rats under test.

Timing of Cotton Dusting

Alabama farmers who dusted their cotton early last year without subsequent treatments might have picked 50 percent more cotton had they waited until the plants were setting and maturing the crop. These are some of the results of experiments conducted by the Alabama station in 1947. Early dusting of cotton with the new recommended insecticides may be not only unnecessary but actually harmful unless continued through the season until the bolls mature. Where three early dustings were made at 5-day intervals, beginning when the cotton began squaring, less cotton was produced in each of four fields than where no dust at all was applied. On the other hand, profitable increase in yield resulted when dusting was delayed and five applications were made during the time the cotton crop was being set and matured.

Of a number of new insecticides tested last year, the station recommended chlorinated camphene, benzene hexachloride-DDT (3–5 mixture), or calcium arsenate alternated with calcium arsenate-nicotine to cotton farmers for controlling cotton insects in 1948. Chlorinated camphene was highly effective against the boll weevil and bollworm, but failed to eliminate heavy cotton aphid populations. Where it was used throughout the season, however, no build-up in aphid numbers occurred. In other experiments, plots treated with chlorinated camphene yielded 403 to 837 more pounds of seed cotton than untreated plots. BHC–DDT (3–5 mixture) gave excellent control of the boll weevil, bollworm, and cotton aphid, and increased the yield an average of 496 pounds per acre. Alternate applications of calcium arsenate and calcium arsenate containing 2 percent nicotine gave excellent control of both boll weevil and cotton aphid and increased the yield 338 pounds per acre, whereas calcium arsenate alone increased it by only 164 pounds. Usually six or seven applications of chlorinated camphene or BHC–DDT applied at the rate of 10 pounds per acre or alternate treatments of calcium arsenate and calcium arsenate-nicotine at 8 pounds per acre at 5-day intervals will give satisfactory control. According to these results the right use of insecticide could have increased the gross income from cotton in 1947 by an average of $47 per acre on more than one-third of the 1,532,000 acres in the State.

Studies of Gin Equipment

Cotton-gin operators naturally seek to produce grades satisfactory to their customers, to reduce costs by increasing the efficiency and volume, and to prevent rises in costs due to decreasing volumes. As an aid toward these objectives, the effects of various combinations of gin equipment on grades of cotton have been determined by the Oklahoma station in studies covering more than 200 gins in 14 counties of western Oklahoma, where practically all cotton is harvested by snapping. Driers were found to improve the value of cotton by $3.65 to $4.80 per bale; the most efficient driers improved the average value per bale by $6.80 as compared with $2.20 for the least efficient. Master extractors, which evidently facilitate the ginning of roughly harvested cotton, improved the values by more than $1 per bale. Moreover, centralized ginning promises savings of $2.50 to $5 per bale in the cost of ginning. A station publication showing the advantages of applying these results has been published for the guidance of farmers and operators in choosing gins and gin equipment.

Spoilage of Grain and Hay

In a bin of oats or a mow of hay the atmospheric humidity varies with the dampness of the grain or hay itself. If this relative humidity exceeds about 85 percent, the crop will readily become heated, musty, and spoiled. Prevention of such spoilage is a major farm problem. Therefore quick tests for moisture should gain wide acceptance by farmers. The Michigan station has developed several methods for determining the moisture content of grains, hays, and other "dry" feeds. One involves the use of an "exhaust-pipe oven," a cylindrical sheet-iron drier attached to the exhaust pipe of a car or tractor, in which the amount of moisture in a hay sample can be quickly found by its loss of weight while drying. Two other methods require no weighed samples, but depend rather upon the moisture-absorbing characteristics of various chemicals and combinations of chemicals. When these are put in with damp hay, grain, or other materials the chemicals become damp and sticky or change color. An indirect result of this research, which may have much practical value in certain situations, is the development of common salt-impregnated wood blocks for use in drying lumber, grains, and hay. These blocks would permit the harvesting of valuable seed crops while they are still too moist for safe storage, but before they have been damaged by adverse weather.

Barn Lay-Out Improvements

In a work-simplification study on Maryland dairy farms much evidence was found of possible economies in operation that would yield substantial savings in time and promote greater efficiency. Barn lay-out was an important factor influencing the time required to care for cows. Narrow feed alleys and obstructions in the alleys made the use of labor-saving equipment difficult. Use of a cart eliminated as much as 85 percent of the walking done previously in the silage-feeding operation. The amount of labor required in milking, the most time-consuming of the dairy chores, was reduced by 39 percent through the use of milking machines. This Maryland station study pointed the way to easier, more economical, and better methods of utilizing labor in dairy operations. In view of the high cost and scarcity of farm labor, the results obtained were both timely and of high potential value to Maryland dairymen in these difficult years of high prices and scarcity of farm labor.

Brucellosis Ring Test

During the past year the brucellosis ring test—originated in Germany, utilized extensively in Denmark, and modified even more recently by the Minnesota station—has been conducted on approximately 4,000 composite herd milk or cream samples. The test is used as a supplement to the agglutination blood serum reaction and gives promise of great importance from an economic standpoint. The test has thus far proved accurate, but failure to disclose reactors will occur in herds not in milk production at the time it is applied. The method will serve as a so-called spot test and will enable the workers to detect the occurrence of foci of infection between regular herd tests employing the agglutination blood serum reaction. It is hoped that this test may speed up the general program of area testing.

On the basis of present field experience it is estimated that with three veterinarians, each having a part-time helper to collect the cream and milk samples, and a veterinarian and technician to supervise and test the samples in a trailer laboratory, the ring testing could be completed in an average county in 1 week. Thus, the application of the test on a semiannual basis in counties under the area program on Bang's disease (brucellosis) control may prove an effective and inexpensive way of keeping the disease at exceedingly low levels in the intervals between the reaccreditation serum agglutination tests.

THE FARMERS HOME ADMINISTRATION

More than 250,000 farmers with family-type farms were helped to better living through better farming during the past year by the Department's program of supervised agricultural credit. About half were using this service for the first time to buy or operate farms; the others were borrowers of previous years who continued to receive help in modern farming practices while repaying their loans.

Only farmers unable to obtain adequate credit from other sources are eligible for these loans; yet the demand for this kind of assistance continued to be greater than could be met with existing facilities. To expand the real estate credit opportunities of these farmers a new program was started during the year under which farm-ownership loans were made by private lenders and insured by the Government.

Since the depression years, more than 1,300,000 farmers have been helped to become more successful tenants or farm operators. The loans made by the Farmers Home Administration and its predecessor agencies total more than $2,163,000,000.

Both the borrowers and the communities they live in have benefited. The farm-ownership loans help carry out the Nation's long-term policy of encouraging family-type, owner-operated farms. In the depression days the operating loans, as a substitute for relief grants, provided a less expensive method of maintaining the economic stability of the country. During the war years the farmers who had received loans were able to make a substantial contribution to the needed increase in food and fiber production. Since the war more than 80,000 veterans have been helped to find their place in the civilian economy through the farm operating and ownership loans of the Farmers Home Administration.

There is a continuing need for this kind of assistance. Even in times of general prosperity a large number of farmers at the bottom of the income scale lack the collateral needed to obtain adequate credit at reasonable rates and terms from private sources. This especially applies to young farmers, many of whom today are veterans. They are unable to obtain the land and operating items essential to increased production. As a result they receive little or no benefit from the improved market conditions.

Many of these small farmers also lack sufficient knowledge of modern farming methods—a science which each year becomes increasingly complex.

To meet their needs, permanent legislation has been provided by the enactment of the Bankhead-Jones Farm Tenant Act, the Farmers Home Administration Act, and the Pope-Jones Water Facilities Act.

Each measure that forms the legal basis for the current supervised-credit program of the Department is the result of careful study by congressional committees of the problems involved. In the case of the Bankhead-Jones Farm Tenant Act the Congress was aided by a study made by a special committee on farm tenancy appointed by the President. The Water Facilities Act came into being as a result of the President's Great Plains Committee Report. The Farmers Home Administration Act evolved after consideration of testimony presented by representatives of leading farm organizations, agricultural economists, and Government officials and after personal field surveys had been made by the Congressmen themselves.

The program authorized by these measures enables the Government to make 5-percent loans repayable in 1 to 5 years for the purchase of supplies and equipment needed to operate a farm; 3-percent loans extending over periods up to 20 years to install or repair water facilities in the 17 Western States; and 4-percent 40-year farm ownership loans for the purchase of family-type farms or the improvement or enlargement of farms to make them efficient family-type units.

Participation of Private Lending Agencies

Steps have also been taken to enable private lending agencies to participate in the financing of the real-estate loans at an earlier stage than they could otherwise. If a borrower is able to make a 10-percent down payment out of his own funds, or, in the case of enlargement or development loans, if he has an equity equal to 10 percent of the total real-estate investment, the Government will insure the repayment of a loan made by a private lender.

This insured-mortgage program was started on a small scale during the past year. Recent amendments providing an assured market for the mortgages and raising the return to the lender from 2½ to 3 percent, were made to place these loans in a better competitive position with similar investments and thus broaden this source of credit to farmers who cannot obtain adequate credit elsewhere.

Through these various loans, the position of the family-type farm in the agricultural economy has been strengthened. The farm-ownership program has helped establish a pattern for efficient family-type farms. The operating and water-facility loans have enabled small farmers to adapt for their own use many of the mechanized methods of large-scale operation.

Several safeguards have been developed through the years to assure the effectiveness of this type of assistance.

One of these is a county-committee system which enlists local people, familiar with local farming conditions, to help the Government adapt its program to meet community needs. In each county a committee of three, at least two of them farmers, passes on the eligibility of applicants, reviews borrowers' progress, and—in the case of farm-ownership loans—certifies the value of the farm that is to be purchased, improved, or enlarged.

The supervision, available with each loan when needed, both helps to assure progress of the borrower and repayment of the loan. This on-the-farm guidance starts when the farmer applies for the loan. With the help of the county supervisor, he prepares a plan of farm and home operations that makes use of up-to-date tested management methods. The plan is acceptable to the committee only if it provides the applicant an income that will raise the level of living of his family, and repay the loan. After the loan is made the supervisor works with the farmer on his farm to help him carry out the provisions of the plan.

In the case of farm-ownership loans special steps are taken to avoid burdening the farmer with a debt that would be difficult for him to repay in years of low returns. The value of each farm purchased is determined by an appraisal based on its normal earning capacity. In addition, provision is made for advance payments in good years to help protect the farmer from falling behind in his payments in lean years.

Every effort has been made to avoid competition with other credit agencies. The loans are made only to those who cannot obtain adequate credit from other sources. When a farmer reaches a position where he is eligible for credit from private or cooperative lending agencies at not more than 5 percent interest and terms prevailing in the community he must refinance his loan.

Loan Applications in 1947–48

During the past fiscal year the agency received 193,000 applications for farm-operating and water-facilities loans and considered 90,000 applications for farm-purchase loans. Of the total applications on hand June 30, 48,000 were from veterans.

During the year 117,800 farm-operating loans were made, totaling $64,845,000; direct and insured farm-purchase loans to 2,500 families totaled $16,800,000; and 884 water-facilities loans amounted to over $1,500,000.

Approximately 41 percent of the funds loaned went to veterans.

Collections made during the last 12 months on outstanding loans totaled $156,000,000.

Cumulative repayments on the farm-operating loans are approximately 85 percent of maturities. More than 752,800 farmers who have received operating credit from the Farmers Home Administration and its predecessor agencies have repaid their loans in full.

Approximately 16 percent of the farm-ownership borrowers have repaid their loans in full out of farm income, years ahead of schedule, and as of March 31, 1948, current borrowers had paid $21,500,000 more than was scheduled on their loans.

In addition to the repayment record there are many other signs of the progress made under the Farmers Home Administration program. Through the livestock, equipment, and land that the loans have enabled them to buy and through the farm and home management assistance they have received from the supervisors, the borrower families have shared greatly in improvements in farming methods that have been developed in recent years. Today in some counties borrowers head the dairy-herd improvement association lists; in other areas they set records for crop production, win soil-conservation awards, lead the way in the utilization of improved seeds and pasture grasses.

Many families who have received aid from the Farmers Home Administration are today leaders in farm organizations. Their sons and daughters are prominent in the activities of 4–H Clubs and Future Farmers.

The gains made by these families are shared by their local communities. The increased purchasing power of borrower families has helped increase the sales of local merchants. Taxes paid by borrowers help their communities support schools, good roads, and other public services. The position of rural churches and farm and civic organizations has been strengthened as these families have taken a more active part in community endeavors.

Insurance of Loans

The Bankhead-Jones Farm Tenant Act as amended by the Farmers' Home Administration Act of 1946 authorizes the Secretary of Agriculture to insure loans made by private lenders for the purchase, enlargement, or development of family-sized farms. The act created a fund known as the farm tenant-mortgage insurance fund to be used as a revolving fund for the insurance of mortgages. There was appropriated the sum of $1,000,000 in the Department of Agriculture Appropriation Act of 1948 to establish the fund.

The act provides that "moneys in the fund not needed for current operations shall be deposited with the Treasurer of the United States to the credit of the fund or invested in direct obligations of the United States or obligations guaranteed as to principal and interest by the United States." In accordance with this authorization, the entire initial appropriation of $1,000,000 was invested with the United States Treasury. As of June 30, 1948, interest on this investment received and deposited to the fund totaled $5,714 and mortgage-insurance collections were $8,092. In addition, mortgage-insurance charges receivable were $6,821, making total assets of $1,020,627.

During the fiscal year 1948, loans insured and commitments to insure totaled $2,490,910. No disbursements were made from the fund during the year and all annual installments were current.

TRADING ON THE COMMODITY EXCHANGES

The need for an expanded regulatory program under the Commodity Exchange Act was emphasized by developments in the commodity-futures markets during the year.

During the period of sharply rising prices in the last half of 1947, and also during the reaction and decline in the first half of 1948, there was a large volume of speculative trading and hedging in commodity futures.

Although the personnel of the Commodity Exchange Authority has been reduced to less than half its prewar level, the agency was called upon to provide regulation for as many markets and commodities as before the war. The number of transactions on the 18 licensed markets in 1947–48 was the largest in 10 years; and the dollar value of trading was the largest on record.

The number of brokerage firms required to be registered under the act increased considerably over the number in 1947. The amount of customers' funds in brokers' hands, requiring segregation audits by the CEA, approximated $200,000,000, or double the level of the previous year. The number of hedgers and speculators in "large-trader" status, who must report daily to the CEA, was also twice as large as in 1947.

In these circumstances the CEA found it necessary to further curtail its regular functional activities, in order to give as much attention as possible to emergency situations which developed during the year.

Speculative activity in grain futures received a fresh impetus in May and June 1947 when wet weather severely reduced the corn-crop estimates; and the grain exchanges sharply lowered their speculative margin requirements, with a very low rate on corn. From May 1 to September 15 the price of the September corn future advanced $1.16 a bushel. In July the CEA conducted a special survey of the Chicago corn-futures market. The results, published on September 8, disclosed that 90 percent of the accounts were speculative; these accounts comprised three-fourths of the total long contracts and two-thirds of all short contracts.

Feverish Speculation in Late 1947

During August and early September 1947 feverish speculation developed in other commodities, particularly wheat. From August 1 to September 15 wheat-futures prices advanced more than 50 cents a bushel. On September 15 the CEA asked the principal grain-futures exchanges to increase speculative margins to 33⅓ percent. But it was not until October 7, after the Commodity Exchange Commision by direction of the President had repeated the request, that the exchanges complied. Speculative trading in grain futures then began to subside.

The need for authority over margins, in order to slow down waves of speculation at their outset, was demonstrated anew in the break in the commodity markets which occurred in February 1948. In the preceding fall, while the exchanges were delaying action on margins, a mass of small speculators crowded into the markets. Many remained there until washed out in the February collapse.

The October increase in grain margins was not retroactive. Speculators already in the market could stay there under the former margin requirement. Sudden, forced liquidation of speculators played the same part in the February price break as feverish buying had played in the 1947 speculative boom.

The Secretary of Agriculture, on December 17, 1947, was requested under subpena to turn over to the Senate Committee on Appropriations all confidential lists of commodity traders in the possession of the Department. Because of a provision in the Commodity Exchange Act prohibiting disclosure of the names of traders, the Congress passed a joint resolution (Public Law 392, approved December 19), requiring the production and publication of such information at the request of a committee of Congress. Accordingly, the Commodity Exchange Authority prepared lists of about 35,000 traders on its records in 1946 and 1947, with the futures transactions and market positions of these traders. In compliance with the subpena and the amendment to the statute, these lists were transmitted to the Senate Committee on Appropriations and published during December and January.

Suppression of Fictitious Transactions

One of the major enforcement projects under the Commodity Exchange Act during the year related to the suppression of fictitious transactions in commodity futures. CEA investigations showed an increasing number of futures positions "held open" for improper purposes, including the avoidance of income taxes.

Following a market-wide investigation, CEA regulations were amended to ban the "holding open" on brokers' records of completed speculative trades in futures. Announcement of the disclosures resulting from the CEA investigation was followed by the issuance of instructions by the Bureau of Internal Revenue which should result in the assessment of millions of dollars of additional income taxes which otherwise would have been avoided.

ELECTRICITY FOR FARMS AND RURAL COMMUNITIES

With 7 out of every 100 American farms receiving electric service for the first time during the fiscal year 1948, and with two out of every three farms electrified at the close of the year, the Nation-wide rural electrification program recorded continued rapid progress, though many problems still lay ahead.

Much of the credit for this rapid expansion of rural electrification belongs to the Rural Electrification Administration and to the rural people who participate in its program.

Rural electric cooperatives are pace setters in this electrification program. Some are nearing the area-coverage goal. Still others are working out problems of power sources and economical distribution of that power in the more sparsely settled regions.

Two major objectives yet remained to be reached. One is to extend electric power to nearly 2,000,000 farms that are not yet served. The other is to see that the electric service now provided to farms is adequate for expanding needs.

In spite of power shortages and difficulties in getting equipment and supplies, new records in rural-electrification progress toward full coverage of unserved areas were set during the fiscal year 1948.

REA made loans totaling $313,023,099 during the year. This surpassed the records of both 1946 and 1947 by over $60,000,000. Miles of line energized and consumers added to REA-financed facilities also set new records for any fiscal year, with 119,375 miles energized and 420,519 consumers added. During May 1948, REA-financed lines surpassed any previous monthly record of consumers connected. In that month borrowers added 51,356 rural consumers to their distribution systems.

About 88 cents out of every dollar lent by REA is used to build distribution systems for rural consumers. Approximately 11 cents is used to develop sources of power and to build transmission lines between power sources and distribution systems. The remaining penny is re-lent by the borrowing organizations to finance consumer installations.

Ninety-two percent of all REA borrowers are rural electric cooperatives. They use more than 95 percent of all REA funds lent. Commercial power companies, public power districts, municipalities, and other public bodies serving rural areas borrow the rest.

REA-financed plants generate about 11 percent of the electric power distributed by the REA borrowers. The rest is purchased at wholesale, largely from power companies but partly from various publicly owned sources of power.

The $313,023,099 lent during the 1948 fiscal year brought the total of REA loans to $1,381,459,261, of which almost a billion dollars had been actually advanced to the borrowers. The full sum is committed when the loan contract is executed, but advances are made only as funds are needed to pay for materials and labor. The 1948 loans will provide funds to bring the total number of miles of line to 931,467 and the number of consumers served by 1,039 REA-financed systems to 2,847,991 when construction authorized by the close of the fiscal year is completed. As of June 30, 1948, 931 systems were operating 666,156 miles of line and serving 2,263,869 consumers. About 77 percent of these consumers were farmers.

Backlog of Loan Applications

Congress has authorized large loan funds each year since the war; yet the backlog of loan applications continues to grow. Three years ago REA had a backlog of $225,000,000 in loan applications on hand or being processed in the field. Though loans totaling $816,491,077 were approved during this 3-year period, the backlog on June 30, 1948, had swollen to $363,031,485. Funds available to meet these unfilled requests and others likely to be made during fiscal 1949 approximate $500,000,000.

The accompanying table shows, by States, the total of loans approved from funds available in 1948, to borrowers in each State, the number of miles of line to be financed by these loans, the number of consumers to be served, and the cumulative total amount of the loans approved from the inception of the REA program through June 30, 1948.

With the encouragement and assistance of REA, new methods in construction, development and operation of rural electric cooperatives are making rural electrification economically possible in areas where obstacles were considered insuperable just a few years ago. The newest developments concern broad expanses of farm and ranch lands in many parts of the United States. Where farmsteads are far apart and the developed sources of power few and small, rural electrification had been considered impractical.

New techniques, lowered financing costs, high power consumption per farm, and especially the averaging of small towns in an area system have made area-coverage electrification economically possible even in many sparsely settled areas. There is need for more power, more use of undeveloped natural hydropower resources, and construction of more transmission lines to bring power into power-deficient areas.

Large Unelectrified Areas

Large unelectrified areas are numerous in the Great Plains. Many of the problems they pose are being solved, and REA borrowers are setting up a comprehensive development program in the region. These activities were made possible largely by the 1944 liberalization of REA loan terms. But high construction costs hamper local efforts to provide service at a reasonable cost.

Many electrified farms of the Great Plains are tremendous users of electric power. In some areas the use averages from 150 to 250 kilowatt-hours per farm a month. This makes economical area coverage possible, provided sufficient power can be furnished at moderate rates.

REA helps the electrification of more and larger rural areas by locating new sources of electric power, and also by advising borrowers in regard to wholesale power rates. In a few cases, REA finds it necessary to make loans for generating plants and transmission lines when adequate power supplies and reasonable wholesale rates cannot be secured and when the need is urgent.

REA borrowers approach in a businesslike way the problem of bringing electric service to all rural consumers in their service areas. They make boundary studies and farm-to-farm canvasses to determine the probable power demand, and their engineers plan electric systems to meet the developing needs of all consumers.

Numbers of new farm users and new miles of line energized, however, are imperfect measures of the accomplishments and potentialities of rural electrification. It is not just the number of farms connected that counts. The true criterion is the service measured against the need. Old lines frequently must be made heavier in order to carry more power to meet soaring demand. More substations and larger transformers in existing substations are often necessary. New and heavier power lines and, in some cases, additional generating facilities are vital to effective service in some areas.

Large Potentialities Beckon

The full potentialities of rural electrification are still far from being realized. Many farms are still to be equipped with electric tools; others await the installation of such ordinary home conveniences as pressure water systems and bathroom facilities. While application of electric power to farming operations has greatly increased in recent years, it is still far from achieving its full possibilities.

The number of electrified farms has soared from less than 11 farms in 100, 13 years ago, to more than 65 farms in 100. Electrified rural schools, churches, and stores run into the thousands.

Nearly a billion dollars in loan funds had been advanced to borrowers through the end of the fiscal year 1948. Payments of principal and interest totaled $168,297,861, including advanced payments of $18,937,368. Delinquency is low; less than 1 percent of principal and interest is overdue more than 30 days. This is a highly creditable record in view of the fact that REA makes 100-percent loans to borrowers who were in the beginning inexperienced in the utility field.

Continued success of the rural electrification program depends largely on local people who, through their cooperative associations, do most of the job. Such people, through cooperative associations yet to be organized or lines yet to be built, will play the main part in the task of bringing electric power to the 2,000,000 remaining unelectrified farms. They share the responsibility as well as the credit.

REA activities, 1948

State	Total of loans approved from funds available in fiscal 1948	Line to be constructed from 1948 loan funds	Consumers to be connected as result of 1948 loans	Total of REA loans approved 1935 through fiscal 1948
	Dollars	*Miles*	*Number*	*Dollars*
States	313, 023, 099	120, 448	363, 488	1, 381, 459, 261
Alabama	9, 642, 000	3, 146	13, 785	42, 137, 649
Arizona	2, 638, 000	369	2, 008	7, 006, 786
Arkansas	8, 464, 000	4, 265	17, 608	36, 016, 000
California	552, 757	138	389	3, 517, 329
Colorado	5, 002, 000	1, 652	4, 803	25, 061, 551
Delaware	110, 000	----------	----------	2, 237, 000
Florida	5, 775, 000	3, 010	8, 633	21, 356, 000
Georgia	12, 902, 000	7, 075	24, 013	59, 689, 330
Idaho	1, 138, 565	194	274	8, 227, 315
Illinois	11, 467, 000	4, 404	13, 777	51, 320, 803
Indiana	5, 175, 162	1, 204	6, 686	39, 601, 726
Iowa	20, 336, 251	4, 390	10, 186	78, 818, 949
Kansas	9, 472, 000	4, 920	9, 292	45, 353, 351
Kentucky	9, 620, 000	2, 672	13, 537	46, 956, 855
Louisiana	4, 234, 000	1, 492	9, 218	25, 156, 600
Maine	75, 000	25	279	1, 273, 500
Maryland	2, 012, 000	144	3, 082	7, 563, 500
Michigan	3, 896, 721	479	4, 104	24, 784, 221
Minnesota	17, 560, 505	7, 475	16, 475	80, 877, 806
Mississippi	10, 208, 000	2, 372	12, 876	46, 499, 953
Missouri	29, 041, 000	8, 770	28, 917	87, 997, 825
Montana	6, 386, 000	2, 806	5, 277	22, 359, 598
Nebraska	14, 177, 000	7, 653	12, 767	49, 962, 263
Nevada	----------	----------	----------	296, 000
New Hampshire	160, 000	[1] −131	365	2, 349, 000
New Jersey	13, 000	[1] −26	----------	701, 500
New Mexico	3, 553, 000	1, 663	3, 804	11, 204, 000
New York	254, 000	72	366	4, 897, 618
North Carolina	9, 090, 400	3, 285	13, 374	48, 229, 552
North Dakota	12, 359, 566	6, 914	8, 838	38, 670, 538
Ohio	5, 364, 279	591	7, 388	36, 483, 580
Oklahoma	12, 136, 000	5, 977	14, 028	45, 709, 506
Oregon	3, 671, 600	989	4, 248	14, 181, 184
Pennsylvania	3, 448, 000	1, 185	5, 363	19, 699, 200
South Carolina	5, 832, 000	3, 066	13, 894	26, 936, 269
South Dakota	9, 927, 000	4, 506	7, 351	29, 251, 154
Tennessee	10, 585, 000	3, 171	16, 024	45, 988, 608
Texas	24, 514, 000	14, 570	35, 839	114, 032, 074
Utah	240, 000	81	45	2, 422, 000
Vermont	64, 000	15	129	2, 848, 000
Virginia	7, 212, 000	2, 806	11, 530	31, 806, 242
Washington	4, 297, 500	1, 121	2, 986	18, 997, 111
West Virginia	----------	----------	----------	952, 000
Wisconsin	7, 257, 793	600	[1] −2, 269	59, 088, 615
Wyoming	2, 442, 000	1, 223	1, 598	10, 392, 600
Alaska	560, 000	130	848	2, 115, 000
Virgin Islands	157, 000	[1] −15	[1] −247	432, 000

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[1] Reduction due to revised estimates.

FORESTRY'S CONTRIBUTION TO CONSERVATION

One of the most important phases of forestry work has to do with watershed protection and the conservation of water resources. Our Nation's water supply is deteriorating. Cases of depleted or reduced ground waters are increasing across the land. Annually, diminished water yields become more apparent. Lowered water tables are developing on the west coast, throughout the entire southwest, in the plains areas and eastward into the Alleghany and Blue Ridge flood plains. Salt-water intrusions occur intermittently along the Atlantic, Gulf, and Pacific coastal regions. Further agricultural, industrial, recreational, and municipal developments are at an impasse in many areas for lack of additional water. At the same time vast amounts of water are wasted and terrific damage is done each year by floods. These floods, in many cases, are caused or at least aggravated by poor watershed conditions resulting from improper use of the land.

The disastrous floods in the Columbia River Basin and other events in 1948 gave new emphasis to this problem. A survey by Forest Service technicians during and after the floods in the Pacific Northwest indicated that watershed conditions contributed to flood peaks. Extraordinary weather conditions and quick snow melt were immediate causes of the flood, but the technicians found ample evidence that considerable water would have been held back if millions of headwater acres had not previously been deprived of their forest cover, mainly by forest fires.

Along with its work to promote soil and water conservation on farm lands and good use of land generally, the Department of Agriculture has a direct responsibility for watershed management on some 150 national forests with a gross land area of more than 200,000,000 acres. Many of these national forests include key watershed lands at the headwaters of important streams. Watershed protection is one of the primary purposes for which the national forests were established.

The Department's Forest Service, which administers the national forests, is carrying on a program of multiple-use management to help coordinate the development and use of timber, water, wildlife, recreation, and other resources. In some areas, special watershed-protection measures are necessary. But in general the management of forests for continuous timber production and of ranges for abundant and continuous forage production makes for good watershed conditions. Hence the national-forest management and development program as a whole helps to meet our water supply and flood-control problems.

National-Forest Range

Watershed protection is vital in the management of western national-forest areas used for livestock grazing. Some 80,000,000 acres of forest and intermingled range land within the national forests are suitable for grazing, and much of this land is important as a source of water for irrigation, power, and domestic supplies. Nearly 9,000,000 animals use these national-forest ranges.

The demand for grazing privileges on the national forests far exceeds the carrying capacity of the ranges, and the Forest Service is under constant pressure to let in more stock. It is also up against pressure from some stockmen who want to convert grazing privileges into vested rights. Yet there is a conservation job to be done—to build up ranges that have been damaged by overgrazing, and to maintain good vegetative growth on the ranges both for its forage value and for its watershed-protection value.

Some national-forest ranges are still overstocked. The Forest Service has been carrying on a program of gradual adjustment of livestock numbers to range carrying capacity. Where reductions are necessary the adjustments are spread over a number of years, to cause as little hardship to the permittees as possible. In a number of areas, however, the adjustment program has not moved fast enough to prevent progressive deterioration of the ranges.

Following complaints by some of the permittees about reductions, a subcommittee of the House Committee on Public Lands last year conducted hearings in the Western States on Forest Service policies and administration of grazing on national-forest ranges. The subcommittee presented to the Secretary of Agriculture a list of six proposals. Four of these proposals were accepted. The Secretary agreed that all commitments and agreements affecting grazing permits on the national forests should be in writing. He agreed that every doubt should be eliminated as to the right of grazing permittees to be represented by counsel at hearings and to receive a transcript of the proceedings. He agreed that the Department would give every possible encouragement to permittees to cooperate with one another and with the Forest Service in range improvement consistent with the public interest. He agreed that the Department would continue to give consideration to economic conditions affecting the livestockmen's operations, the local communities, and tax structures, when reductions in numbers of livestock under permit on the national forests were made. Agreement on these points was in large measure a confirmation of policies already in effect.

Another proposal was for the establishment of impartial appeal boards designed to represent the interests of the general public, as well as the permittees and the Forest Service, so far as grazing and livestock operations on the national forests were concerned. The Department could not approve the setting up of boards with final authority over grazing on the public forests, if that meant turning over the final administrative decisions to such boards and surrendering its responsibility for management of the national forests in the public interest. However, the Secretary was quite willing to have boards representing all interested groups help advise the Department on national-forest policies. A national-forest board of review was set up in May 1948.

Local advisory boards representing national-forest grazing permittees have been in operation for many years. Some 800 such local boards are now functioning. It has long been the practice for national forest supervisors to consult with these boards in connection with allotments and adjustments of grazing permits.

The other proposal was for a 3-year moratorium on livestock reductions on national-forest ranges. This the Secretary could not approve. It would have meant postponement of action badly needed to stop deterioration of watershed and range lands and start them on the road to recovery. The overgrazed conditions on many national-forest ranges are too serious from the standpoint of both watersheds and forage to bear such a delay.

At least half the grazing allotments are in good condition. On the remainder, some adjustments will be necessary, in some cases involving reductions in livestock numbers. The over-all reduction program for the next 3 years is small, but unfortunately the reductions cannot be spread uniformly over all national-forest ranges. Obviously the most heavily overgrazed and deteriorating ranges need the greatest reductions.

The Forest Service, however, is having splendid success with reseeding certain types of range and with other range-betterment work. Such programs in many cases improve the range without requiring reductions in livestock numbers. Much more of this work is needed. Range carrying capacity can often be increased several times by reseeding. A program of reseeding run-down ranges is being carried out as rapidly as available funds permit. Construction of drift fences and development of stock-watering places make possible a better distribution of stock on the range and often result in range improvement.

Some members of the livestock industry are persisting in proposals to turn over national-forest lands "suitable for grazing" to the States, or to sell these lands to individual stockmen, or in other ways to put greater control of grazing use in the hands of present permittees. Such proposals ignore the interests of recreationists and sportsmen in these public lands, of irrigation farmers and all other water users, of hundreds of towns and cities and industries dependent on national-forest watersheds for their water supplies. Almost no national-forest land is exclusively valuable for grazing. On most national-forest lands, watershed values are paramount. Large areas are used jointly for grazing and timber production, and many of the other lands used for grazing are in stringers and pockets of timberland so intermingled with other national-forest lands in watershed units that it would be most uneconomical to administer them separately.

Not all of the stockmen agree with these dangerous proposals for dismembering the national forests. In Colorado, for instance, 26 local livestockmen's associations have repudiated these proposals.

In its report on last year's hearings, the House Committee on Public Lands said:

> By reason of their tremendous importance to the Nation as a whole, our committee is of the unanimous opinion that our national forests should not be sold to private ownership or transferred to the States, but should remain in Federal ownership.

Livestock grazing is a desirable and productive use on great areas of national-forest land, but national-forest lands have other important uses and values as well. Under a system of multiple-use management, the Forest Service is endeavoring to administer these public forests for the highest total of benefits and services to local and national welfare.

National Forest Board of Review

In May 1948 the Secretary of Agriculture appointed a National Forest Board of Review composed of private citizens to advise his office in the solution of problems arising in connection with administration of the national forests. The Board also will be called upon to advise on the disposition of appeals to the Secretary by forest users, including grazing permittees, from decisions by the Chief of the Forest Service affecting their operations. Establishment of this Board of Review was an outgrowth of one of the proposals, mentioned earlier, made by a subcommittee of the House Committee on Public Lands.

The advisory group was appointed on the basis of personal competence and not as the representative of any groups or organizations interested in the use of national-forest land. Members have no financial interest in the use of this land. The Board will meet at the call of the Secretary.

Members named to the Board were Dr. Jonathan Forman of Columbus, Ohio; Prof. Gilmour B. MacDonald, formerly head of the department of forestry, Iowa State College, Ames, Iowa; and Dr. Roland Roger Renne, president of Montana State College, Bozeman, Mont. All three accepted appointment.

National Forest Receipts

Receipts from timber sales, grazing permits, and other uses of the national forests during the fiscal year 1948 totaled $24,122,889, an increase of $5,750,090 over those of the preceding fiscal year, and an all-time high record. Sales of timber and other forest products accounted for more than $20,000,000 of the total; grazing fees amounted to nearly $3,000,000; and fees and rentals for power sites, summer-home sites, and various other special uses of national-forest land brought in the remainder.

The revenue-producing activities in the national forests more than pay their way—notably timber-management work, which brings in $4 to $5 for each dollar spent. But substantial areas of national-forest land are of nonrevenue-producing character—areas above the timberline, for instance, or the chaparral forests of southern California. Protection of some of these areas is very costly, but the vital watershed values of many of these areas make effective protection of them necessary.

Many of the national-forest activities also are nonrevenue producing. Most recreation facilities and services are provided for the public free of charge. Roads and trails are constructed and maintained for the benefit of the public. Wildlife-management work brings no direct returns, although the cash expenditures of some 4,700,000 hunters and fishermen who utilized the national forests in 1947 meant an important source of income to local businessmen, and the income to many of the States from sale of fish and game licenses is largely based on the hunting and fishing opportunities provided by the national forests. Watershed-management work likewise produces no revenue, but the value to local communities and the Nation in terms of flood control and safeguarding of water supplies is inestimable. All told, the costs of national-forest administration and development undoubtedly are more than returned in public services and benefits.

Although lands in national forests created from the public domain never were subject to tax and many of the lands acquired through Federal purchase were tax-delinquent at the time of purchase, the Department feels that national-forest lands should contribute a fair share toward the maintenance of local governments. Under present law 25 percent of the national-forest receipts each year goes to local county road and school funds. However, payments based on annual receipts are apt to fluctuate considerably from year to year, and different national forests vary widely in amount of receipts. Denuded lands, recently acquired for national-forest purposes, bring in few receipts during the period of restoration.

Some method that would put the Federal financial contributions to local governments on a more stable and equitable basis would be desirable. Legislation enacted by Congress in 1948, authorizing the acquisition of certain lands for the Superior National Forest in Minnesota, provided for an annual payment to the counties containing these lands of three-quarters of 1 percent of the appraised valuation of the lands. The Department believes that this system of annual payments based on a fair percentage of true value of national-forest property could well be applied nationally.

Forestry Research

Many cut-over forest areas in the United States are now understocked and the timber growth is of poor quality. We are only now beginning to learn what yields can be expected from well-managed stands and what the optimum stocking of these stands should be. This is a field for increased attention in forest research if we are to keep up with the demands for intensive forest production.

In the Lake States it has been found that the maximum board-foot increment in northern hardwood stands is attained when the growing stock left after cutting is about 6,000 board feet per acre. At this stocking, the net average annual growth per acre was found to be 216 board feet, while for greater or lesser stockings the increment was lower.

Increased demand for forest products has brought into use a number of species of trees that in the past were given little attention, either because of the higher quality of their associates or because of their infrequent occurrence or relative inaccessibility. Many problems relating to the management of these once-neglected species need to be answered. One of these newly appreciated species is lodgepole pine. The Rocky Mountain Forest and Range Experiment Station has determined that lodgepole pine stands can best be reproduced by clear-cutting in strips, with alternating strips left uncut to seed in the clear-cut areas. One of the difficulties with any partial cutting in lodgepole pine is that windthrow of remaining trees is likely to be severe. The station has found that clear-cut strips should not exceed 150 feet in width since, as the clear strip becomes progressively wider, the danger of windfall becomes increasingly greater. Clear strips should run at right angles to the prevailing wind movement. Long, unbroken strips should be avoided since they give a chance for a funneling of the wind.

The Lake States Forest Experiment Station issued a series of pamphlets on the management and uses of aspen during the year. This species, which occupies large areas of cut-over lands in the Lake States, was formerly neglected but is now used extensively for pulpwood. Similarly, aspen in the Intermountain region is being recognized as having considerable importance, as are the true firs in California.

Forest-products research has as its objective the more complete and efficient utilization of the forest crop through new and improved mechanical and chemical conversion processes, through better harvesting methods, through removal of obstacles standing in the way of the utilization of neglected species and waste of various kinds, and through improvement in the serviceability of wood and wood base materials. This work is centered at the Forest Products Laboratory, maintained by the Forest Service at Madison, Wis. Typical of last year's activities were the following:

One of the most promising potential uses for large quantities of low-grade wood and wood wastes is as sugar for industrial chemicals and for livestock feed. Wood-sugar molasses produced at the Laboratory is being tested as a feed for beef cattle, hogs, chickens, and sheep. Agricultural experiment stations in Connecticut, Michigan, Wisconsin, Washington, Oregon, Montana, Idaho, Wyoming, Louisiana, and Mississippi are cooperating in the feeding tests. Preliminary feeding experiments have shown that the Laboratory's wood sugar is palatable, and the feeding experiments are being carried a step farther to compare the relative value of molasses from wood and that from other sources. Further laboratory and pilot-plant research is under way to improve the efficiency of the wood-molasses-making process and to determine whether it can be made profitable under competitive conditions.

A new type of structural material, known as "sandwich" construction is now available to the designer, architect, or engineer for use in aircraft, housing, or wherever a light-weight, strong, rigid material is desired. To permit full utilization of the sandwich, which is made of high-density, high-strength facings firmly bonded to a light, low-strength core, it was necessary that sufficient design data be established. These had to be based on the properties of the component materials since it is not economically feasible to test all the possible sandwich constructions. The Forest Products Laboratory has now established properties for most of the common facing materials, such as veneer and plywood, and for many core materials. Evaluation studies of others are being continued.

Results of a study of equipment requirements and methods involved in fabricating simple lines of products at small mills were made available by the laboratory in a publication entitled "Fabrication of Wood Products at Small Sawmills and Woodworking Plants."

Cooperation With the States and With Private Owners

The cooperative farm woodland management projects carried on under terms of the Norris-Doxey Act of 1937 continue to be popular with owners of small woodlands. In each project, a trained forester provides on-the-ground advice to woodland owners, helping them to apply improved woodland management practices, to harvest timber and other products and at the same time maintain or increase the productivity of the forest, and to realize greater returns from their woods. Project foresters are unable to keep up with the demand for such services; at the end of the fiscal year there were hundreds of unfilled requests from individual woodland owners.

There are now 173 farm woodland management projects, maintained in cooperation with 40 States. The Federal Government shares half of the cost. At least three times as many project foresters are needed if all counties with small, privately owned woodlands are to be serviced. On July 1, 1948, all projects were placed under State direction on a reimbursement plan of financing similar to the cooperative forest-fire control and tree-distribution programs.

Federal cooperative assistance in the prevention and suppression of forest fires on State-owned and privately owned forest lands is carried on under authorization of the Clarke-McNary Law of 1924, in 43 States and 1 Territory (Hawaii). During 1947 the area under organized protection was extended by 9,000,000 acres, to a total of 328,000,000 acres. However, there still remained 111,000,000 acres of privately owned forest lands needing but not yet receiving organized protection. Furthermore, the present degree of protection in many areas is below what is considered to be adequate.

COOPERATIVE EXTENSION WORK

The Cooperative Extension Service is the chief agency through which the Department performs its educational function. It porvides the means through which pertinent information regarding economic, scientific, technological, and other developments of significance are relayed to individual families in such form as to permit rapid application to everyday problems. It is the Department's primary means of assisting farmers and homemakers to develop the know-how essential to successful modern living.

This service is coperative as between the Department, the State land-grant colleges, and local people. Each contributes to the financing of the service, to the body of knowledge to be taught, and to program content. This feature provides that degree of adaptability essential to meeting successfully the varying problems facing the people in different local areas at any given time. At the same time this service provides a joint facility for the research findings of both the Department and the land-grant colleges to be relayed effectively to those who can profit directly from such research. This service is unique. Its record of contributions to the welfare of rural people is such that it is being copied, in many respects, by various other countries undertaking somewhat similar measures to improve their agriculture and rural life.

Extension's function is education. The major fields of Extension's educational endeavor have historically been those basic to the development of more efficient farms, better homes, higher incomes and standards of living. These continue to constitute the basic core of Extension work.

However, currently, those whom Extension serves are interested in educational services on a much broader front than the specific operational problems of the farm and home. They are seeking educational assistance which will enable them better to understand many problems of significance to the welfare of entire communities, the State, and the Nation. They are seeking information as to various ways in which such problems may be met. Examples of problems of this type are: Local health conditions, services necessary to improve them, and various ways in which such services might be obtained; local school facilities in relation to need; problems of land use in relation to both individual and general welfare; various means of insuring a stable and profitable agriculture; the stake of agriculture and the Nation in international trade and world peace, and many others.

In addition to demands for educational services on a broader front of problems, Extension is receiving requests for assistance from a larger number of people. These come both from within the groups most frequently served, and from other groups as well. The increased demands from within the groups normally assisted result from recent rapid advancements in science and technology of immediate significance to farming and homemaking, a greater readiness to accept and apply research findings, an increasing confidence in the teaching of the Extension service, and a gradual advancement in the formal educational status of the populace. Among other groups from whom Extension is receiving increased calls for educational services are part-time farmers and farmers living in low-producing agricultural areas; industrial workers living in rural areas; residents of small towns and villages; and, to an increasing extent, residents of the larger urban centers. To a very significant extent urban residents are calling upon Extension for guidance on such matters as commercial horticulture and floriculture, home and community landscaping, gardening, nutrition, health, and wise purchase and use of agricultural food commodities.

Program Emphasis

In view of these facts Extension programs in 1948 continued to expand over those of previous years. Emphasis was continued on rendering an improved educational service in connection with problems of the farm, the home, and rural youth. Programs in these particular areas were directed to aiding farm and rural people to interpret and apply the findings of research in all the fields of significance.

Broadly, these programs were directed to such matters as improving crop and livestock production methods; more efficient marketing; soil, woodland, and wildlife conservation; use and care of farm machinery and equipment; construction, care and use of farm buildings; installation and use of electricity, both in farm operations and in the home; financial management; farm and home planning; home gardening; home improvement; family nutrition and health; clothing; efficient use of labor; and many other such specific and practical matters of immediate concern.

Within this general area of problems circumstance justified special emphasis on certain items. Two examples are cited. In view of the serious livestock feed situation extra efforts were directed to assisting farmers to conserve feed. Practically every educational approach available to Extension was used to assist farmers in employing more efficient feeding methods; in controlling destructive insects and rodents; in increasing pasture-carrying capacity; in marketing livestock at lighter, more efficient weights; in improving feed-storage facilities; and in utilizing every practical means of handling immature corn to preserve its maximum feeding value.

Increased attention was directed to marketing farm products. Educational work was done not only with producers, but also with local buyers, processors, wholesale handlers, and retailers. Likewise, programs were developed to aid consumers in the more effective purchase and use of farm products and, in turn, to alleviate seasonal surpluses, and to expand market outlets. Thirty-one States inaugurated new and additional educational work on marketing under the Research and Marketing Act, including new activities dealing with improvements in marketing methods, facilities, and equipment, market information, and consumer education.

In addition to rendering educational services with such problems of immediate interest to individuals, educational services were rendered in connection with many problems of group concern. The need for improving rural health conditions is an example. Rural people in many areas were aided by Extension in studying the local rural health situation, the adequacy of health facilities and services, and practical means of improving them where the need was evident. Assistance was rendered, in cooperation with State health departments and medical societies, in stimulating an interest in and an understanding of the provisions of the Hospital Survey and Construction Act and in the development of plans for an integrated system of rural hospital services. Educational work was continued on health-contributing measures such as adequate nutrition, sanitation in relation to health, and the like. Near the close of the year extension workers from 15 States, rendering educational assistance on rural health problems, participated in the National Health Assembly and in a national workshop of 2 weeks' duration to develop plans for more intensive educational work in this field in the years ahead.

Extension was called upon to provide factual information and assistance in studying many other problems of both local and national interest which could be met only through group action. The widening disparity between rural and urban educational facilities and services, to the detriment of rural youth, was a problem commanding attention in many States and counties. County agents, home demonstration agents, and 4–H Club agents contributed information and educational leadership in analyzing this situation.

On an even broader front Extension aided local study and discussion groups to analyze and appraise problems of State, National, and international concern regarding which they were seeking objective information. Topics considered included such matters as the ruralchurch situation, parity prices and parity income, the relation of adequate diets to farm surpluses, taxes, inflation control, agriculture and international trade, the Marshall plan, and means of insuring world peace.

4–H Club Work

Enrollment in 4–H Clubs increased 9 percent over that of the preceding year to a total of 1,760,000 rural boys and girls. These club members continued their usual programs centering around specific farm, home, social, and civic responsibilities. In addition, in keeping with their theme for the year—"serving as citizens in maintaining world peace"—they undertook new and timely activities of particular significance. For example, detailed reports from 8 States indicate club members from these States contributed over $20,000 to purchase garden seeds as gifts to distressed European families. Many other States, from which detailed reports are not available, participated in this effort as well as in the purchase and shipment of hand garden tools greatly needed by European families. Club members also contributed to the purchase of CARE food packages. The 4–H Club organization raised funds to send 17 American youths to 7 different European countries to live and work with farm families for several months as messengers of good will and international understanding. Arrangements were also made with European sponsors for a similar group of their youth to have a comparable experience in this country.

Special attention was also directed to the problem of juvenile delinquency and its abatement through proper recreation, constructive use of time, and the creation of a better understanding of the problems of developing youth. Approximately 13,000,000 rural boys and girls throughout the years have had the benefit of 4–H experience. A large percentage of these boys and girls are now farmers or farmers' wives. They are providing much of the informed leadership of rural America. Others have found their place in urban occupations and are making a valuable contribution to urban welfare and stability. The significance of these contributions may easily be underestimated.

Another age group which received specific attention was the older youth and young adults beyond 4–H Club age, and not yet fully participating in adult extension work. Several hundred thousand of this general age group were provided special educational assistance, both individually and as members of organized groups.

Farm-Labor Program Terminated

The Farm-Labor Program, which has been a major responsibility of the Cooperative Extension Service since 1943, ended on December 31, 1947. During the 5-year period more than 26,000,000 farm labor placements were made, the program being an important factor in enabling farmers to maintain agricultural production at unprecedented levels throughout the 5-year period. On January 1, 1948, the United States Employment Service resumed the conduct of a farm-placement service, discontinued in 1943 when the Congress authorized the Department of Agriculture and the State extension services to establish the emergency farm labor program.

Helping Meet Emergencies

Wherever necessary all local extension resources were directed to helping people meet unusual emergency situations, as in the Columbia River flood area. Local extension agents in this catastrophe helped with evacuation, supervised the feeding of hundreds of suddenly displaced persons, until other agencies could be mobilized for that purpose, and assisted in finding temporary shelter for flooded-out residents, their livestock and other possessions. They collaborated with State health departments in getting health protective information out to the victims. Immediately these agents readjusted their programs and provided practical guidance to people in rehabilitating their homes, in adjusting their farming operations to meet the immediate emergency conditions, and in developing plans for the longer time adjustments.

Development of Staff

To meet all these responsibilities, and many others, the Cooperative Extension Services in the States, Alaska, Hawaii, and Puerto Rico at the end of the year had a staff of 8,586 county agricultural, home demonstration, and 4–H Club agents and assistants. This represents a net increase of 1,945 such workers since July 1, 1945, when the first increment of funds authorized by the Bankhead-Flannagan Act became available. Eighty-five percent of the professional extension workers employed with these and increased State and local funds were county workers. The total technical staff of State and county extension workers at the end of the year was 11,211. Even with this number of county workers each agricultural agent and assistant agent had an average of approximately 1,000 farm families to serve in addition to rural nonfarm families and increasing numbers of urban residents. Each home demonstration agent and assistant agent had an average "class" of approximately 1,500 farm families in addition to the numerous rural nonfarm and urban residents.

The problem of adequately rendering educational services in connection with the various types of problems involved, and all the different interest groups, was accentuated in 1948 and the immediately preceding years by an exceptionally rapid turn-over in extension personnel. An unusually large number of county extension workers have resigned in recent years because of the numerous opportunities for employment at higher salaries, both within governmental services and in private employment. This fact, coupled with the limited number of graduates from agricultural and home economics colleges who have been available for employment recently, has prevented as large a net gain in the number of county extension workers as available Bankhead-Flannagan funds and increased State and local funds would otherwise have made possible. Moderate increases in salaries have been made through the use of such funds, but generally not enough to strengthen the staff as rapidly as circumstances warrant.

Rapid strides are being made in catching up on the extension research and training programs curtailed or laid aside during the war emergency. Field studies to obtain factual data on the effectiveness of various teaching methods and procedures, and the training of State and county workers in the newer techniques, help to offset the rapid turn-over of personnel and increase the effectiveness of the services being rendered rural people.

Fully half of the States now have extension research personnel working closely with the research unit of the Extension Service of the Department in the collection and analysis of scientific information on a wide range of extension problems, and in testing the application to extension of the findings of the educational researches conducted by colleges, universities, and similar research agencies.

More adequate preparatory training of new extension employees is receiving widespread attention. Several States are providing an opportunity for apprenticeship training prior to induction. Orientation training at time of employment and systematic on-the-job training afterwards contribute to the improvement of the staff and are reflected in increased accomplishments and higher standards of performance. Training conferences, workshops, and 3- to 4-week summer session courses dealing with extension methodology are generally utilized as effective training devices. Extension workers from nearly every State participate in such activities provided on the State level or in one of the three area training centers organized to supplement the training programs of individual States.

Progress in field studies and personnel training will unquestionably be accelerated during the years ahead in order to remove the lag of the emergency period and to make full use of these modern tools in improving the effectiveness of extension work.

Extension Problems Studied

During the year a committee, jointly appointed by the Secretary of Agriculture and the president of the Association of Land Grant Colleges and Universities, was engaged in a study of the Cooperative Extension Service. The purposes of the committee were: (1) To make an appraisal of the past services and experiences of this cooperative system; (2) to study current basic problems in connection with cooperative extension work, with special attention to relationships between the Department and the colleges; and (3) to develop recommendations as to ways in which the Service can best meet the problems of the future.

Near the close of the year, after approximately 18 months of study, this committee completed its report. This report includes consideration of such matters as accomplishments of the Cooperative Extension Service, its functions and objectives, the joint responsibility of the Department and the colleges in conducting the extension program, relationship of extension to other agencies, operating procedures, financing, and the job ahead.

This is the second such comprehensive study of extension work—the other having been made in 1927. The findings of this committee should contribute significantly to the future effectiveness of the Service and to improved educational aid for the people, on their farms and in their homes, on problems relating to agriculture and home economics.

THE DEPARTMENT'S GRADUATE SCHOOL

The United States has a critical shortage of scientific and technical personnel. Probably its scientists, engineers, and technicians generally number all told not more than 750,000 persons, among whom probably less than 140,000 do research, teaching, or technical development work. In recent years both public and private institutions have provided large sums for research, teaching, and scientific development. Scientific personnel has not increased proportionately. For example, congressional appropriations for scientific research and related activities doubled between 1930 and 1940, and increased more than threefold between 1940 and 1947. Available trained personnel between 1930 and 1940 increased 85 percent; but only 35 percent between 1940 and 1947. The resulting disparity between scientific personnel and the demand for their services is most acute in Government agencies and in universities. Despite its greatly increased scientific activities the Government's share of the scientific personnel is about the same now as it was in 1930; while the share of the universities has dropped from 49 to 36 percent. The industrial share has increased greatly.

This Department is one of the Government's largest employers of scientific and technical personnel, and it feels the shortage keenly. It looks to the universities as the primary source of new supply. Through its Graduate School it cooperates with the universities in action both to lessen the immediate shortage and to improve the long-run situation. In addition, the Department depends on its Graduate School for study courses that employed personnel can use to improve their knowledge and usefulness. Cooperative arrangements between the Department and the Association of Land-Grant Colleges and Universities have been developed to help in overcoming the general shortage of scientific personnel. In this program the Graduate School plays a leading part. Among other features, the cooperative plan calls for the employment in the Department, for limited periods, of postgraduates and postdoctorates from the land-grant colleges and universities, in work that will give them invaluable specialized experience.

Another significant development reflects growing interest in the professional aspects of cooperative extension work. The Association of Land-Grant Colleges and Universities encourages the movement actively. Its executive committee recommended development of graduate programs in cooperative extension education by at least one land-grant institution in each of four regions. Programs leading to advanced degrees in cooperative extension education have been established at Cornell, Missouri, Colorado, and Mississippi State. In addition, the Department's Graduate School offers courses of special interest to extension personnel who can come to Washington for temporary work with the Extension Service here. This opportunity to combine work with study takes form in a program developed by a Graduate School committee representative of both the Federal and State Extension Services.

Graduate training, however, does not complete the education of a scientist. Holders of advanced degrees must have opportunities to keep abreast of recent developments; otherwise they will soon lack much indispensable knowledge. Accordingly, through its Graduate School the Department helps scientists and others to keep up with scientific progress. Specifically, it organizes seminars and lecture programs in sequences that will enable the participants to follow related studies continuously. For example, seminars this year on plant physiology and nutrition and on plant breeding and genetics follow seminars of the previous year on progress in antibiotics and in the development of insecticides and fungicides. Next year the seminars will emphasize weed-control practices and virus diseases in man and animals.

Passage of the Research and Marketing Act of 1946 increased the demand for professional personnel in Federal and State agricultural institutions. Activities started under this legislation presuppose an increase in the available scientific personnel. The training problem is receiving attention in the Department and the affiliated State institutions. The Graduate School has enlarged responsibilities for training research people in the field of marketing. Also, as a further contribution to the training program, the Graduate School has received authority to publish significant manuscripts for which printing funds might otherwise not be available. Still another development in the Graduate School's program deserves notice here. Long-range plans for the school are being studied by a committee composed of representatives of the Department, of the land-grant colleges, and of the United States Office of Education.

COUNTY HOUSING OF AGRICULTURAL AGENCIES

The establishment of an agricultural center in each county, where all agencies serving the farmer may be housed together, seems basic to the fully successful administration of any long-range farm program. The idea of consolidated housing is not new. In a few instances, where county agricultural buildings or other comparable facilities exist, there is ample evidence of their value, both to the agencies occupying the buildings and to the farm population served. The Department, through Congressional legislation, has given great emphasis to a cooperative farmer-committee type of administration in the county, but the physical facilities available seldom promote the best development and effectuation of the program.

A recent survey conducted through the USDA State and county councils reveals that there are 468 counties in the United States where all of the agricultural activities are housed together. The survey further reveals that there are in existence 232 county agricultural buildings designed to house all agricultural activities together. A high percentage of this number, however, are not adequate for current needs. A total of 816 counties report agencies occupying widely scattered locations.

The Department has recommended that the Congress consider a coöperative building program with the States and counties to provide consolidated housing of agricultural activities in the county, which will serve as a focal point for administration of farm programs.

THE DEPARTMENT'S PERSONNEL

Rising costs of living in 1948 made it difficult for some of the Department's employees to make ends meet. Some loss of personnel resulted, along with added difficulty to the Department in filling vacancies and new positions. Pay disparities between USDA jobs and similar posts in private employment were wide in the upper grades, owing of course to the existence of the $10,000 salary ceiling. In a number of instances this ceiling held the pay of high officials down to the rates in effect for their immediate subordinates. Some professional and administrative persons gave up positions in the Department to take private employment at three or four times the salaries they had been receiving. The general pay increase of $330 which the Congress voted eased the pressure somewhat in the lower grades, but not appreciably for the higher positions.

Total employment in the Department reflects emergency as well as normal conditions, but the times of national emergency are not necessarily the times of maximum USDA employment. For example, paid full-time employment in the Department gradually rose before World War II. A report to the Civil Service Commission for August 1941 showed 88,132 full-time workers. On the other hand the trend throughout the war years was generally downward, with interruptions in the summers of 1945 and 1946 partly from the influence of developing postwar operations. In 1947, the employment total declined again, from reductions necessitated by changes in appropriations. By December 1947 the full-time total was down to 51,821, the lowest in more than a decade. An upswing in early 1948 was seasonal.

The Department appointed a medical officer to direct its health program; this action was by the authority of Public Law 568, Seventy-Ninth Congress. Activities under the health program emphasize health campaigns, the treatment of any illness that requires emergency attention, and the making of preemployment and other physical examinations. Other important personnel activities during the fiscal year 1948 included the inauguration of honor and cash awards programs, the establishment of a Federal employees loyalty program whereby the Department cooperated with the Federal Bureau of Investigation and the Civil Service Commission in handling over 60,000 loyalty forms, and the establishment of registers of eligibles under decentralized authority for the filling of field and departmental vacancies. Following examinations announced and held by boards of civil service examiners, registers of eligibles were established and used to convert approximately 2,900 nonstatus employees to civil-service status and to recruit approximately 2,050 probational employees. Various agencies of the Department absorbed the cost of this decentralized program.

Charles F. Brannan,
Secretary of Agriculture.

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